

AMERICAN ARTISAN

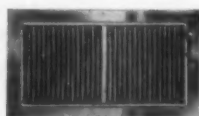


RESIDENTIAL AIR CONDITIONING
WARM AIR HEATING • SHEET METAL CONTRACTING

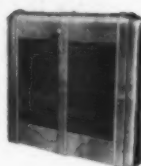
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HERE'S AIR CONTROL'S ALL STAR LINE OF REGISTERS FOR YOUR 1945 BUSINESS

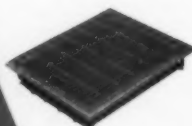
AIR CONTROL offers a complete yet compact line of Registers, Ceiling Ventilators, Roof Ventilators, Attic Ventilators and Accessories that meets every requirement. When you chose your 1945 requirements, select AIR CONTROL—your assurance of always having the most modern improvements in Registers and Accessories. The AIR CONTROL Research Department is constantly incorporating innovations into the AIR CONTROL Line. Delivery is unusually prompt for wartime conditions.



AIR CONDITIONING REGISTERS—in three designs—Dual Control—Horizontal Fin Type—Vertical Fin Type.



GRAVITY REGISTERS — modern Gravity Registers—adjustable for forced air.



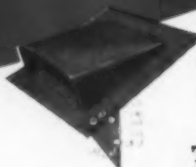
FLOOR REGISTERS & RETURN AIR FACES — with "Rigid-Lock" fret construction.



ADJUSTABLE CEILING VENTILATORS — complete units with floor register, telescoping box and ceiling face.



ATTIC VENTILATORS—two outstanding type for ventilating attic spaces.



ROOF VENTILATORS — for ventilating four-way roofs.



Publisher's Bind.

These and many other items make AIR CONTROL your best buy in 1945.

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AIR CONTROL PRODUCTS, INC.
COOPERSVILLE MICHIGAN

SPEED UP FABRICATING



WITH *Thor* PORTABLE ELECTRIC TOOLS

Get More Jobs Done . . . More Profit!

In the shop or on the job Thor compact, lightweight electric drills will assure you of the utmost in production.

Now more than ever before you need power tools for post war jobs. The large volume of post war jobs will more than justify your investment in modern, efficient Thor power tools.

"Armored in Plastic" the Thor $\frac{1}{4}$ " portable electric drill with the rugged modern plastic housing is fully 14% lighter than comparably rated conventional styled drills. The lightweight of the drill has been accomplished without sacrifice of motor size or power. In actual day-after-day use it has been proved that this sturdy drill will stand up under the most severe working conditions while providing outstanding performance.

The Thor Portable Electric Drill illustrated is the original close-coupled, smaller, lighter,

half inch drill. As a heavy duty tool, this highly efficient, handy drill was designed for continuous service on long, hard jobs. Incorporating all of the proven THOR design features, this sturdily constructed tool is one of THOR'S outstanding achievements in nearly half a century of leadership in modern portable tool manufacture. No other half inch electric drill can give you such compact power and lightweight convenience with peak efficiency. Your nearby THOR dealer will gladly assist you with your planning for THOR Drills, Grinders, Sanders, Hammers, Screwdrivers, Nut Setters, Saws, Polishers, etc., see him today.



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AMERICAN ARTISAN

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

WITH WHICH ARE MERGED

**FURNACES
SHEET METALS**

AND

**Warm-Air
Heating**

J. D. Wilder, Editor

A. A. Kennedy, Assistant Editor

Vol. 114, No. 1 January, 1945 Founded 1880

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In This Issue

THIS 1945 Directory issue reflects the picture of an industry getting ready for the post-war era while it is, at the same moment, stuck fast on "dead center" by the disastrous turn in the war and the resulting need for much more of everything.

Our brief report (page 105) of 1945's outlook and Arnold Kruckman's last-minute report of Washington's tightening up on civilian production (page 112) shows, we believe, that we should expect no more in quantities of furnaces, sheets, motors, accessories, than we had in 1944.

At the same time, this new year is marked by new developments of such far-reaching importance that we can truly say our industry is on the threshold of a new era.

For example, of general business interest, the article on Three Post-war Tax Plans (page 118) should get thorough consideration by every man who hopes to survive. And the article on "Wage Incentives" (page 114) opens up a whole new field for thought.

In heating, we enter the year with a brand new Code and Manual (page 129) which probably will be the industry's one and only design and installation method. Professor Konzo will write a series explaining why and how to use the new code.

And we have given considerable space to "panel heating." Professor Giesecke—one of our best-known authorities on the subject—explains (page 132) how to design a "panel" system and an actual job (which is also a "solar" house) is described on page 150.

Give time to the simplified line of pipe and fittings the industry will be offered—page 154.

How to organize your working force for post-war products and production is explained on page 159.

And proper ways to handle that bug-a-boo of war work—magnesium dusts—are described on page 163.

Member of Audit Bureau of Circulations—Member Associated Business Papers, Inc.

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**for
INSULATION
for
FIREPROOFING**

**for
ECONOMY
Use the
BEST**

For more than 50 years SAL-MO Asbestos Products have been used for insulation and fireproofing in building and industrial installations.

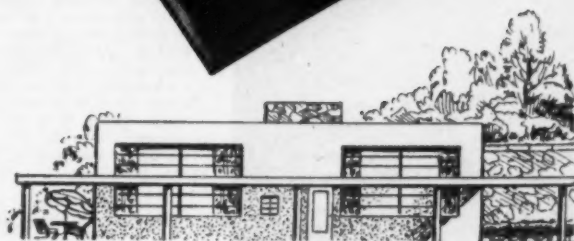
SAL-MO Asbestos Products include Asbestos Plain and Corrugated Papers, Millboard, No. 77 Ductboard, Pipe Coverings for hot and cold water pipes and high and low temperature steam lines, Tank Jackets, Boiler Cements and many other items.

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SALL MOUNTAIN COMPANY •

**176 WEST ADAMS STREET
CHICAGO 3, ILLINOIS**


AMERICAN ARTISAN, January, 1945




WHITNEY-JENSEN TOOLS



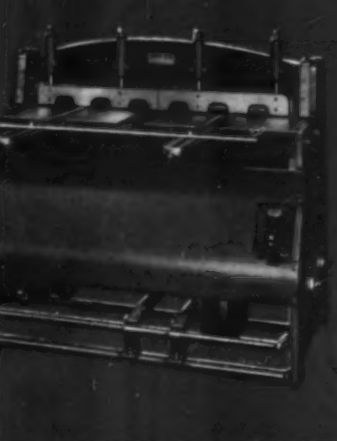
BENDING BRAKES. The Whitney-Jensen combination roller bearing bending brakes (shown) represent a modern departure from the old conventional hand brake design. All standard sizes from 4' to 10' available. Also available (not shown) are 18 gauge and "air conditioning" models.



No. 5 JR. METAL HAND PUNCH. The Whitney-Jensen No. 5 Jr. metal hand punch is powerful, light in weight, and very easy to use. Capacity $\frac{1}{4}$ " hole through 16 gauge mild steel, depth of throat 2", furnished in either metal or paper box.



Nos. 129 and 130 DEEP THROAT POWER PUNCH PRESSES. The Whitney-Jensen No. 129 and 130 Deep Throat Power Punch Presses have these distinctive features: high speed, deep throats, all steel welded frames, inexpensive auxiliary attachments and various punches and dies from stock. Capacity, 10 tons. Throat depths, 12" and 18".



Nos. 7, $7\frac{1}{2}$, 8-IMPERIAL ROLLER BEARING PUNCHES. General-purpose lever-action punches of widely proved serviceability. Will punch and strip positively inside 90°. Punches and dies can be changed quickly. There is no lever to become disengaged by moving too far in either direction. Three sizes, with capacities of $\frac{1}{4}$ " hole in $\frac{1}{8}$ ", $\frac{3}{16}$ ", and $\frac{1}{4}$ " mild steel respectively. Three punches and dies furnished.

Nos. 1828, 1829, 1858, 1868 DEEP THROAT LEVER PUNCHES. A versatile machine suitable for a wide variety of work. Made in 7", 10", 18" and 24" throat depths. All-steel-welded frame and stand. Powerful geared action. Capacity, $7\frac{1}{2}$ tons. Throat height, 6", die space $\frac{3}{4}$ ". Standard equipment includes depth and side gauges, punch holder, die adaptor, die shoe, and one punch and die.

No. 20 BALL BEARING PUNCH. A portable tool of universal use. It weighs only 18 lbs. yet easily develops 39,500 lbs. punching pressure because of screw press action with ball bearings in the race. A convenient base, shown, can be used to set this tool up on a bench or in a permanent position. Capacity, $\frac{1}{2}$ " hole in $\frac{1}{2}$ " mild steel, throat depth $2\frac{1}{4}$ ", throat height $1\frac{3}{4}$ ". One punch and die furnished, ratchet handle available.

Nos. 28, 29, 58, 68 DEEP THROAT TOGGLE ACTION FOOT PRESSES. Deep throats and powerful punching action permits handling a wide variety of work including pieces previously beyond the scope of similar equipment. Made in four popular throat depths—7", 10", 18", 24". Capacity, 5 tons or 2" hole in 16 ga. mild steel. Operators often handle 100 pieces a minute or better. Throat height $6\frac{3}{4}$ ", length of stroke 1", stroke adjustment $\frac{3}{4}$ ". Standard equipment includes depth and side gauges, punch holders, die adaptor, die shoe, and one punch and die set.

No. 10 BALL BEARING PUNCH. The No. 10 is the smallest of a "family" of Whitney-JENSEN punches (Nos. 10, 11, 12, 20, 24, 25, 26, 27, 40) famous for tremendous punching power with very light weight. Because of portability and power combined, these punches will pay for themselves quickly in time and money saved even on one small job. No. 10 has a capacity of $\frac{3}{8}$ " hole in $\frac{1}{4}$ " mild steel and weighs $9\frac{1}{2}$ lbs. Throat depth is $1\frac{1}{8}$ ", throat height $\frac{7}{8}$ ". One punch and die furnished.

No. 72 SERIES POWER SQUARING SHEARS. Features of Whitney-JENSEN Power Squaring Shears include flywheel and motor enclosed between housings, housings made of steel plate, high speed for production work, and simplified blade adjustment. Available in four sizes—36-in. and 42-in. width, 16 ga. capacity, in 42-in. width, 14 ga. capacity, and in 60-in. width, 12 ga. capacity. Efficient machines for jobbing or production work.

No. 247 18-INCH PRESS BRAKE. This small-sized press brake will aid in cost reduction where there are quantities of small formings being done in large presses. The frame is of welded steel construction, workmanship of the highest quality, the operation simple, and maintenance reduced to a minimum. Specifications include 1" length of stroke, 1" lower beam adjustment, $11\frac{1}{2}$ " throat height, $\frac{1}{4}$ " throat depth, speed 47 strokes per minute. Capacity is 14 ga. mild steel over $\frac{3}{8}$ " 90° V die, or $4\frac{1}{2}$ tons. Ram and die shoes take standard $\frac{1}{2}$ " tongues.

Write for new Whitney-JENSEN
Catalog No. 16-45 ready soon.

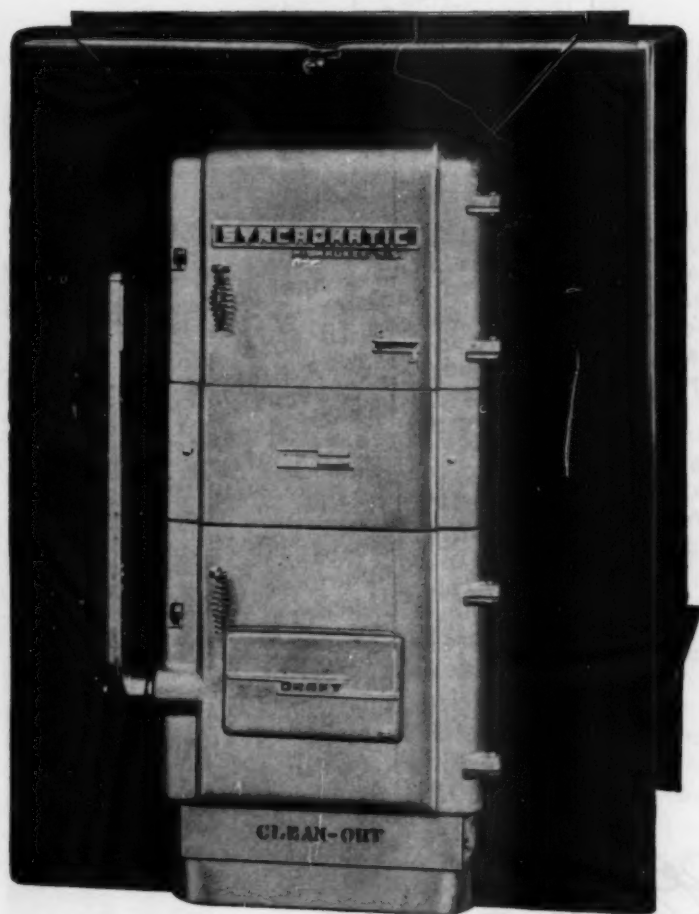
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CORRESPONDENCE TO: WHITNEY-JENSEN TOOL COMPANY, 1000 N. 10TH ST., CHICAGO, ILL. 60642

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SYNCHROMATIC

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WE'VE GIVEN YOU YOUR IDEA OF HEATING —
**THE FINEST OF ALL WARM AIR
FURNACES** — Ask Your **JOBBER**
or write for details.

It's wise to Build your Future Sales on the Product of your own judgment!

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- ... "IT MUST STAND UP WITH
PARTS INTERCHANGEABLE"
- ... "BUILT LEAKPROOF AND SAFE"
- ... "IT MUST BE EASY TO FIRE"
- ... "A SLIP FRONT"
- ... "A SIMPLE CASING"
- ... "PUT A COOLING LEG ON THE
GRATE"
- ... "DESIGN ONE GRATE FOR ALL
TYPE OF COAL"

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THAT WAS A BIG ORDER!

THEN you said—"and all
this at **NO** extra cost!"

SYNCHROMATIC CORPORATION

3373 NORTH HOLTON STREET • MILWAUKEE 12, WISCONSIN



TUTTLE & BAILEY
INCORPORATED
NEW BRITAIN, CONNECTICUT

January 1, 1945

To Our Customers:

The labor shortage in New Britain, Conn., has become more acute than ever because of the increased demands of the Armed Forces for the weapons of war being produced in this area. Production of our regular lines is limited not only by lack of manpower, but also by the precedence which must be given to Radar items currently on the Navy's "must" list, and by directives which have been issued by the Procurement Agencies of the Armed Forces.

We are hopeful that as the year unfolds these conditions which have impaired our service will change materially, and we look forward to the day when we can again concentrate all our efforts on supplying the needs of our regular customers.

We extremely regret that we are temporarily unable to give you prompt service, but we are sure you agree that our first concern is to provide our Armed Forces with the tools for a quick Victory.

Very truly yours,

TUTTLE & BAILEY, INCORPORATED

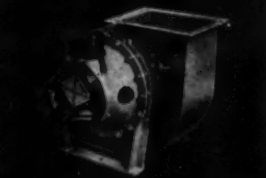

Stanley Hart, President

SH:dhm

WHY DOES ILG BUILD ITS OWN MOTORS?



ILG Self-Cooled Motor Propeller Fans



ILG Direct-Connected Centrifugal Fans



Because neither you, we, nor anyone else can buy standard makes of motors which are efficient for direct-connected drive of all types and sizes of ventilating and heating equipment!

By designing and manufacturing our own motors you are provided exactly the speed, power and special characteristics required for each size of Propeller, Axial-Flow or Centrifugal Fans, as well as Unit Heaters and Unit Coolers. This makes possible *direct-connection* of motor and wheel to end wasteful friction...to cut your costs all along the line—*installation, servicing, maintenance!* It brings you big savings in space—permits extremely compact installations—"factory-set" alignment for remarkably long life. You benefit from

special features such as the patented Self-Cooled Motor on Propeller Fans. Finally, you get the full protection of the "ONE-NAME-PLATE" Guarantee covering each complete unit, *including the motor.* For finest quality air handling equipment for home, business or industry, call nearby Branch Office (consult classified directory) or write us today.

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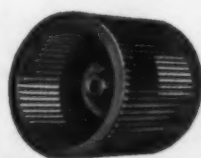
usAIRCO EQUIPMENT

designed and engineered for efficient heating and air-conditioning

Blower Wheels—Scroll Housings—Blower Assemblies



Blower Assembly



Forwardly Curved Wheel



Scroll Housing



Blower-Filter Unit—Packaged in a compact, attractive, sturdy cabinet, and engineered to do a real job at low cost, the usAIRCO Blower-Filter unit has plenty of sales-appeal.

It is simple and efficient in design—harmonizes well both from appearance and engineering standpoint with modern heating installations in stores, community buildings and homes. Widely used in furnace installations for winter heat distribution and summer cooling. The large filter area in these units holds from 3 to 12 filter mats in the standard sizes.

Combining a high standard of performance, and economy in operation, the usAIRCO

Blower-Filter unit builds up repeat sales for itself on the job. There are six standard sizes for residential and commercial air conditioning installations with capacities from 800 to 6000 CFM. See catalog No. 440-BF.

Kooler-Aire Cold Water Unit—Used for cooling and dehumidifying where water of 60° is available. Delivers comfort-cooling at low operating cost. Portable, suspended type. Available with capacities from 1000 CFM to 12,000 CFM.

The perfectly balanced centrifugal blower forces air through 3 saturated filter pads.



Kooler-Aire Cold Water Units

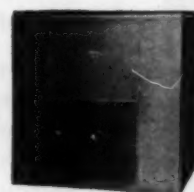
usAIRCO designs and manufactures wheels, housings and assemblies for the special needs of furnace manufacturers, makers of air conditioning units, dryers and special equipment.

The usAIRCO Blower assembly rates high because of its wide adaptability. As an integral part of a fuel-conversion unit it is capable of effecting worthwhile economies in heating.

Blower assemblies in either double inlet or single inlet types may be adapted to warm air furnace installations or incorporated in unit air conditioners or blower-filter units.

Operating records underline two important features which have made usAIRCO Blower assemblies long-time favorites in the heating and air conditioning field: they are extremely quiet; engineered for trouble-free, vibrationless operation.

usAIRCO Wheels, Scroll Housings and complete Blower assemblies have a reputation for dependability . . . a wide acceptance everywhere, because they are designed to make profit for both seller and customer. Details in usAIRCO Bulletin 440-F.



Kooler-Aire Gyra Spray Evaporative Cooling

Cleaned and cooled air is delivered through Deflecto-grille having full directional control.

Kooler-Aire Gyra Spray—A self-contained cooling unit, moderately priced, low, in operating cost. Operates either with direct water connection or with recirculating pump and automatic float valve.

The patented usAIRCO Gyra Spray has a powerful whirling action to keep filter mats fully saturated. Dual V-shaped mats give greater cooling area, insure thorough air cleaning. Available with Deflecto-grille, single or double fan, 4 or 6 row coils, wide range of capacities.

At war's end, usAIRCO Evaporative Cooling units will again be available. They will find a ready market, because usAIRCO units have built up an enviable record for dependable low-cost cooling in stores, theatres,

recreation centers and commercial installations of many types. Dealers will welcome and profit by the return of the efficient, packaged system of low-cost evaporative cooling pioneered by usAIRCO. Ask for Bulletin 460.

UNITED STATES AIR CONDITIONING CORPORATION

Manufacturers of the most complete line of air handling equipment. Factory representatives in principal cities.



NORTHWESTERN TERMINAL
MINNEAPOLIS 13, MINNESOTA



*Quiet
Randall*

Streamlined . . . **STRONGER** the Randall One-Piece Steel Housing Pillow Block

Randall No. 240 One-Piece Steel Housing Pillow Block, the most popular bearing among furnace blower and air conditioning equipment manufacturers, has been streamlined by Randall engineers and made even stronger and with less resistance to the flow of air.

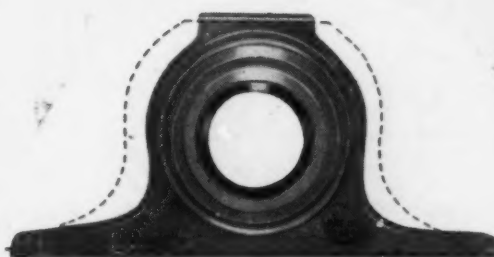
This is the same one-piece steel housing put into Randall's production line in 1938, that became the leader in the furnace blower and air conditioning field. The field operation of Randall Pillow Blocks is so satisfactory that over 2,000,000 have been installed on air handling equipment.

Randall engineers have effected the streamlining and strengthening of this bearing by forming the housing around the spherical ball to provide less resistance to the flow of air and increase transverse strength.

All of the efficiency of the large single or double oil reservoir and the constant self-aligning features are maintained in this bearing.

When available, this new streamlined bearing will be furnished either with or without vibration grommets No. 2400 and angle washers No. 2401, and equipped with either No. 125 or No. 126 oil cups. For shaft sizes $\frac{3}{4}$ " to 1".

We expect production samples available on or about March 1, 1945. Write for details and our Pillow Block Catalog No. 42.



SMALLER, STRONGER HOUSING

The dotted line shows the area of the popular Randall One-Piece Steel Housing Pillow Block, compared to the new Streamliner model. The new design gives more strength and greatly reduced air resistance.

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Every Basement is a "GOLD MINE" for Alert FURNACE DEALERS

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A-R-A SHEETS: Seal joint spaces to form Ducts for Cold Air Return! Score or roll into complete Ducts for Heating, Ventilating, etc.! Quiet Duct noise!

ASBESTOS AIRCELL PAPER: Insulate Warm Air Pipes! Get Greater efficiency! Get Heat to "Hard to Heat" Rooms! Insulate pipes running thru unexcavated areas!

COLD WATER PIPE COVERING: Use "Frost-proof" type for unheated areas! Use "Anti-Sweat" type in heated areas to prevent sweating and rust!

ASBESTOS PIPE JOINT TAPE: Don't let basement air be sucked into your heating system! Cover all joints in pipes and casing with tape! Makes joints stronger! Makes heater job!

ASBESTOS RANGE BOILER JACKET: Insulate Hot Water Tank! Save Fuel! Get Hotter Water!

ASBESTOS FURNACE CEMENT: "Set" all Furnace Sections! Eliminate Dangerous Gases and Smoke! Takes strain off Castings! Preserves life of Furnace!

ASBESTOS PAPER: Make Supply Pipes ab-light, safer and stronger! Prevent Rust! Cover Furnace ceiling! Cover Asbestos Aircell Paper! Paint to match basement color scheme!

ASBESTOS MILL-BOARD: Fireproof Ceiling over Furnace or Heater! Deflect intense heat from floor above!

A-R-A SHEETS: Seal joint spaces to form Ducts for Cold Air Return! Score or roll into complete Ducts for Heating, Ventilating, etc.! Quiet Duct noise!

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ASBESTOS FURNACE CEMENT: "Set" all Furnace Sections! Eliminate Dangerous Gases and Smoke! Takes strain off Castings! Preserves life of Furnace!

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Insulation is a Natural now! Everyone understands it and wants it. They want the heat

GRANT WILSON, INC.

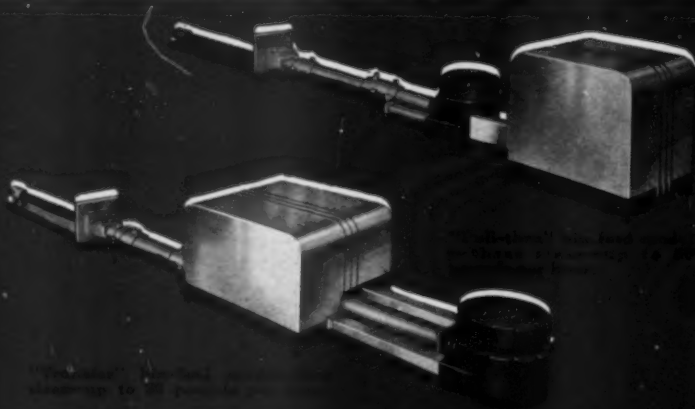
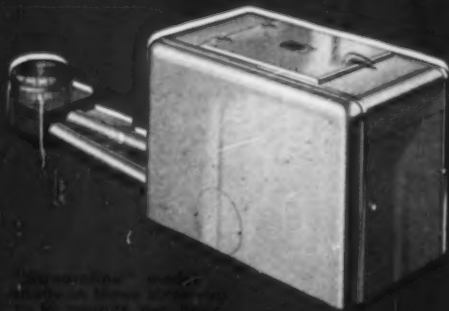
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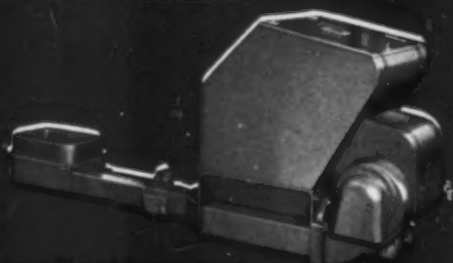
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COMMERCIAL



INDUSTRIAL



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Automatic
COAL BURNER

ECON-O-COL



THE SHIELD
OF QUALITY

The "Stronghearted" Stoker

MANUFACTURED BY COTTA TRANSMISSION
CORPORATION ★ ROCKFORD, ILLINOIS



PRESSED
STEEL

A MESSAGE . . . FOR YOUR POST-WAR FILE

Back in 1942, with every forging mill and foundry badly overloaded, the Ordnance Department turned to the stamping industry in desperation. New applications, new methods and new presses were quickly developed, and the results were successful far beyond expectations.

These new stamping techniques, tried and proven on many vital war products, will be introduced into our post-war furnace production. The huge Morrison presses ask no compromise with complicated shapes nor heavy gauge steel. With these presses and new automatic fabrication methods the furnace industry will be represented in the MASS PRECISION PRODUCTION class by MOR-SUN.

The furnace trade will like the MOR-SUN product and merchandising policy. The builder and home-owner will like the MOR-SUN ruggedness and efficiency -- and every one will like the smooth, flowing lines of the MOR-SUN die-pressed casing.

Keep your eye on the MOR-SUN emblem - it symbolizes quality and beauty.

MOR-SUN Pressed Steel FURNACES - For Coal, Gas & Oil
MORRISON STEEL PRODUCTS, Inc. BUFFALO 7, N. Y.

Luxaire **FACES**

**WITH AN ABUNDANCE
OF RESOURCES**

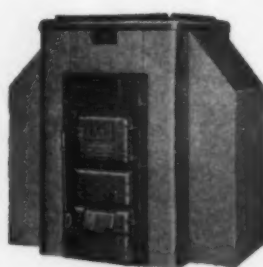
**The Pre-war Line of Luxaire WARM AIR FURNACES
AIR CONDITIONING UNITS • COAL • GAS • OIL**
for All Types and Sizes of Homes



Series 600
Coal Fired Steel
Gravity Furnace



Series C
Coal Fired Cast
Gravity Furnace



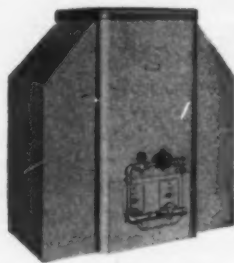
Series 700
Coal Fired Steel
Gravity Furnace



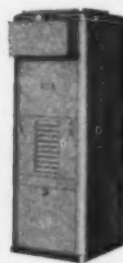
Series AC-700
Coal Fired Steel Air
Conditioning Unit



Series A
Gas Fired Steel Air
Conditioning Unit



Series G
Gas Fired Steel
Gravity Unit



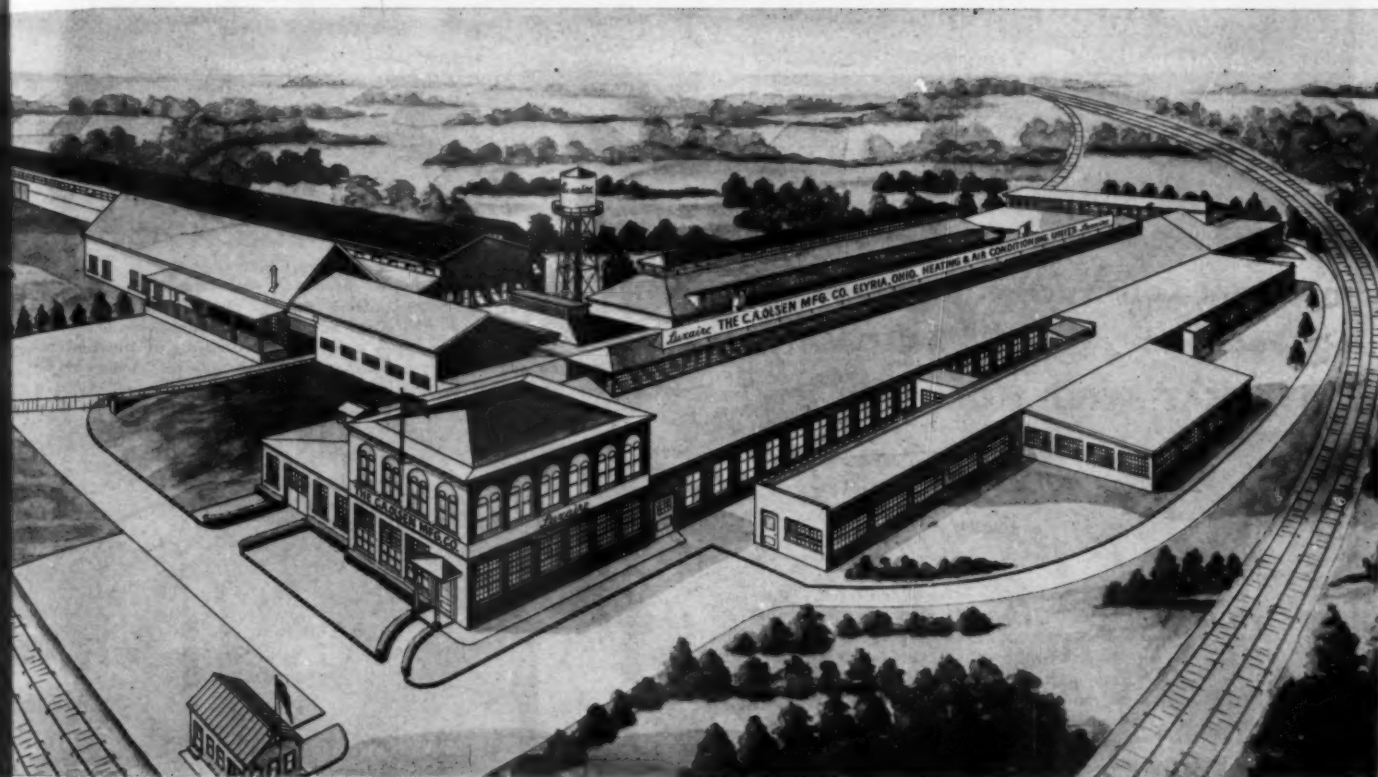
Series H
Gas Fired Steel Utility
Air Conditioning Unit



Series 8000
Oil Fired Steel Air
Conditioning Unit

THE C. A. OLSEN MANUFACTURING COMPANY

THE FUTURE



PREPAREDNESS to meet the tremendous demands which will be made by the peace time heating market, is foremost in Luxaire's postwar planning.

With greatly increased facilities, developed to meet war-time production schedules, Luxaire is geared to produce—in volume. These expanded facilities include an enlarged plant . . . modern, time-saving machinery . . . streamlined mass production methods.

Luxaire Engineers, for a long period, have been designing, developing, testing new units. Luxaire faces the future, confident that its postwar products will meet the most exacting demands of the future.

After Victory, these abundant resources will swing into action, producing heating equipment for coal . . . gas . . . oil which will give Luxaire a position of leadership in the warm air heating and air conditioning industry.

Luxaire

WARM AIR FURNACES
AIR CONDITIONING UNITS
FOR COAL • OIL • GAS

ACTURING CO. Elyria, Ohio

Fuel-Saving and Temperature Control is Possible ONLY with a COMPLETE 3-PIECE CONTROL SET

AUTOMATIC HEAT REGULATOR SET Includes — Thermostat, Limit Control, Damper Regulator Motor, and all accessories. Tried and proved throughout more than ten years of successful use in thousands of homes, and as standard equipment by leading furnace manufacturers, it carries the same reputation for **DEPENDABILITY** demonstrated by all A-P precision-built controls.

Important Construction and Operating Features of **AUTOMATIC HEAT REGULATOR SET**



Modern Wall Thermostat

This attractive, streamlined A-P Thermostat is capable of controlling the room temperature within 1° variation above or below its setting. A special composition base contains all operating parts. It can be mounted easily on any wall, requiring only a single 1/4" hole for the cable—no need for disfiguring the wall for outlet boxes often required by other types. Cover carries accurately calibrated thermometer. Convenient manual setting is the only adjustment required.



Limit Control

Vitality necessary for fuel-saving operation, the Limit Control has an importance too often overlooked, especially by those who would make low price their main selling effort. **IT PREVENTS OVERHEATING** and consequent fuel waste.

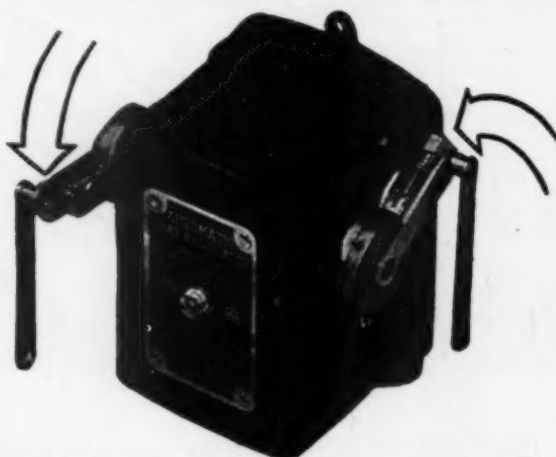
By setting the warm air limit control according to season and outdoor temperatures, you keep the heating system under **CONTROL**, really saving fuel and adding comfort. When the furnace temperature moderates to a safe degree,

then the warm air limit control again turns its control of the dampers over to the room thermostat.

Separate A-P limit controls are made for warm air, hot water, and steam heating systems. All have convenient dial settings.

Damper Regulator

The A-P Damper Regulator Motor, compact, sturdy, is of the four pole type, and has exceptional lifting power. Gears and pinions are made of high grade steel, and all electrical connections are carefully soldered . . . and every detail of construction is planned for long service and corrosion resistance so necessary for basement use. Motor requires no attention except oiling once a year.



EXCLUSIVE RELATCHING FEATURE. A special spring latch knob is provided on each of the two arms of the A-P Damper Regulator to permit dropping the arms for closing the draft and check when stoking the fire. If forgotten, the arms will **AUTOMATICALLY RELATCH** at the next motor operation. This is an important safety feature on the A-P Regulator Motor.

Accessories . . . included in the complete set: Transformer, conductor cable, non-rusting furnace chain, cable wire, pulleys, staples, screws, snap links, and complete instructions.

For steady comfort, convenience, and years of fuel-saving furnace or boiler operation — **IT'S WISE TO BUY THE BEST . . .**

Insist on a complete **THREE-PIECE A-P AUTOMATIC HEAT REGULATOR SET.**

Competitively priced

AUTOMATIC PRODUCTS COMPANY
2470 North Thirty-Second Street Milwaukee 10, Wisconsin



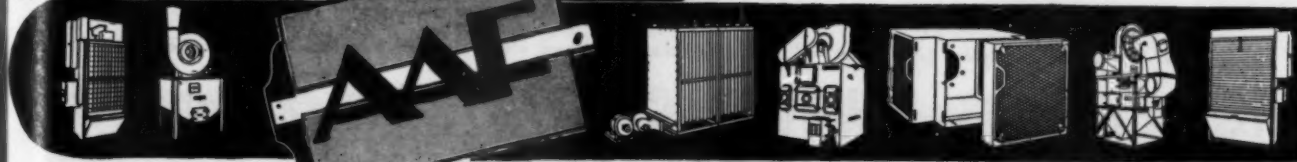
DEPENDABLE CONTROLS

For Heating • Air Conditioning • Refrigeration

Your Answer to Unit Filter Problems is *INSIDE*

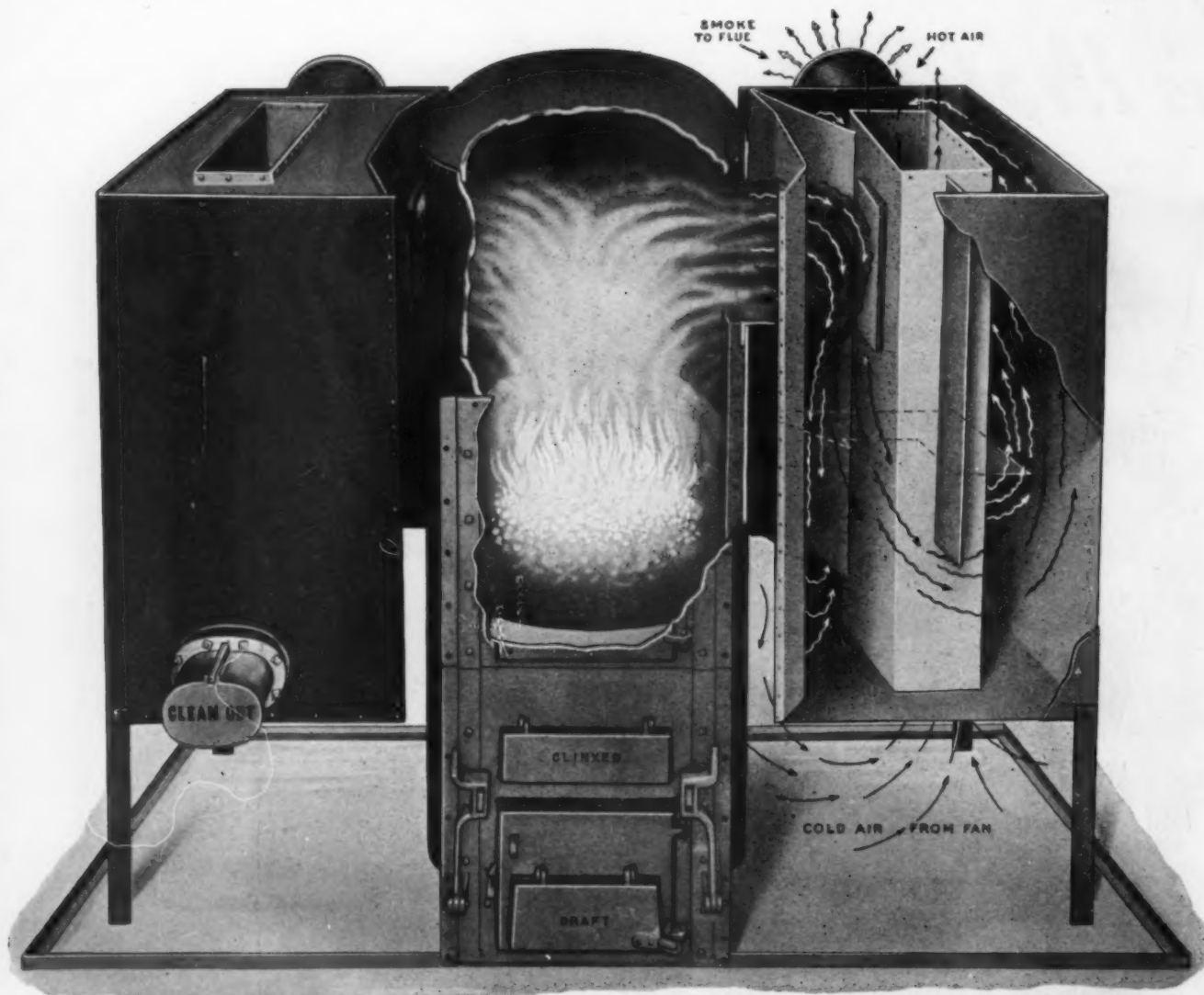


This valuable **FREE** engineering bulletin will be sent you without obligation—Write for it now!
American Air Filter Co., Inc.,
 355 Central Ave., Louisville 8, Ky.
 In Canada, Darling Bros., Montreal



ENGINEERED DUST CONTROL

PEERLESS *Commander* Heavy-Duty FURNACE



SPECIFICATIONS — PEERLESS *Commander* No. 750 DR

Diameter Drum (obround)	Height of Drum	Height of Radiator	Grate Area Sq. In. Sq. Ft.	Heating Surface Sq. In. Sq. Ft.	Ratio Heating Surface to Grate Area	Height to Bottom of Smoke Pipe Collar	Diameter Smoke Pipe	Casing Size Height	Shipping Weight—Lbs. Less Casing With Casing
31½"x48"	66"	46"	1048 7.28	30,959 215	29.55	49½"	14"	91"x58" 75"	3340 3855
FORCED AIR RATINGS									
BTU-Coal	Firing Rate Lbs. Per Sq. Ft. Grate Surface		BTU	BTU-Coal		Firing Rate Lbs. Per Sq. Ft. Grate Surface	BTU		
11,500	7.5		486,000	12,500	7.5		528,000		
	10.0		698,000		10.0		759,000		
12,000	7.5		507,000	13,000	7.5		549,000		
	10.0		728,000		10.0		789,000		

Specifications on other Peerless Heavy Duty furnaces on request.

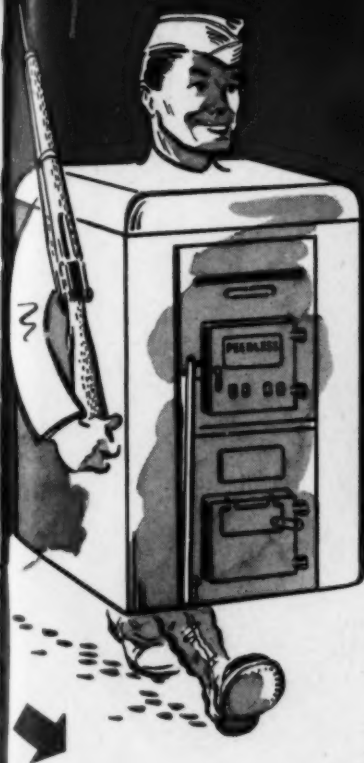
Wire or Write for Descriptive Literature and Complete Information on other sizes of Peerless Warm Air Furnaces.

THE PEERLESS FOUNDRY COMPANY, Indianapolis, Ind.

Pioneers in Warm Air Heating for Over a Third of a Century

PEERLESS

*Working at War —
Planning for Peace*



The war job still comes first at Peerless, and must continue to do so until the war has been won. We are glad that our manufacturing facilities and experience can contribute to our country's war effort.

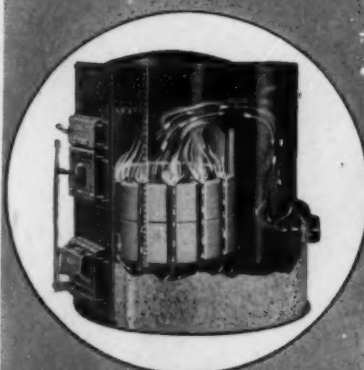
Peerless furnaces, fittings, registers, blowers, electric controls, asbestos paper and all heating needs are available to you from one source.

Peerless engineers have been looking ahead and planning for the time when our entire facilities can once more be devoted to our regular production of warm air heating equipment. We can assure Peerless dealers that when that time comes we will be ready for them with a line that will incorporate every refinement and improvement in design and construction which will make for increased efficiency and profitable selling.

PARTS STILL AVAILABLE

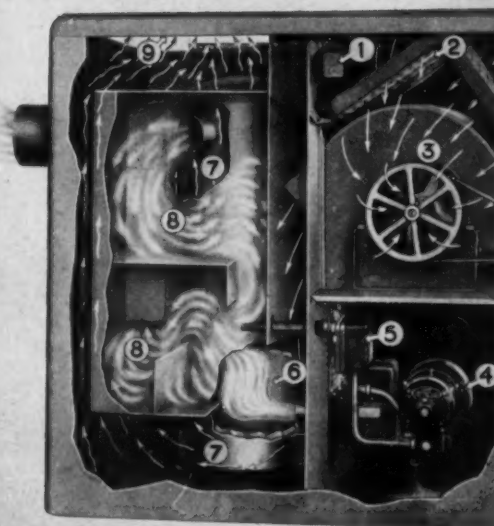
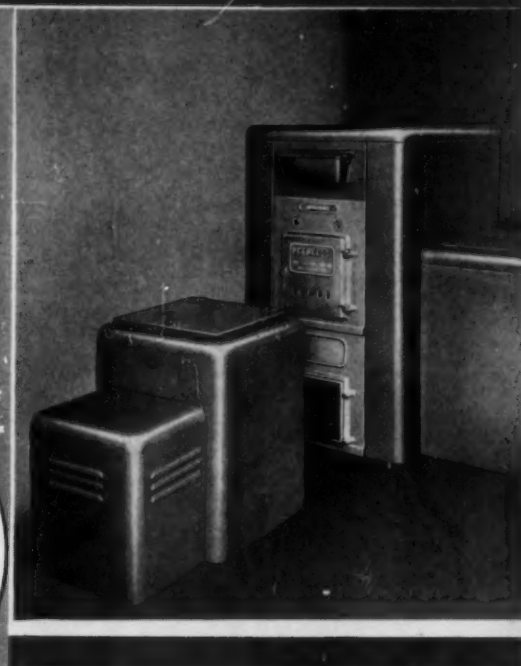
Peerless is still in position to supply parts for most makes and models of warm air heating plants. Orders are being filled as rapidly as possible under present conditions. Give your customers good service now on repairs—it is your best insurance for post-war business.

▶ Latest design **PEERLESS Streamliner** steel furnace, complete with large, silent blower, filters, automatic humidifier. Truly a DeLuxe unit at a remarkably low price. Beautiful baked enamel finish.



▶ Here is another exceedingly popular unit in the complete **PEERLESS** line. **PEERLESS** round type furnaces—in either steel or cast iron—are designed and built to give dependable, economical service for a long period of time.

▶ **PEERLESS MASTER** Automatic Furnace for small and medium size homes. Note the compact simplified arrangement of all the component parts and the intricate maze of baffling in the big radiator that delays passage of flue gas to chimney.



PEERLESS FOUNDRY COMPANY

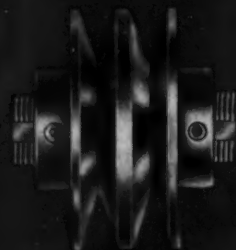
INDIANAPOLIS 1, INDIANA, U. S. A.

Planners in warm air heating for over a third of a century

The Answer to your
V-PULLEY PROBLEMS



Cast Iron
 Single Groove V-Pulley



Cast Iron Double Groove
 V-Pulley



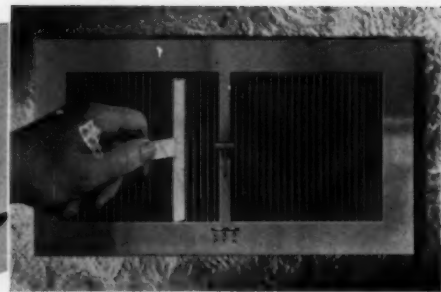
Cast Iron Triple Groove
 V-Pulley

Maurey V-Pulleys, once installed, perform continuously without attention. Their quality is taken for granted, because users quickly recognize the superior Maurey design and sturdiness.

Use Maurey V-Pulleys for trouble-free performance.

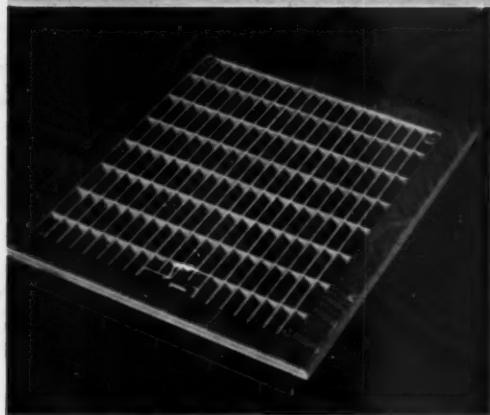
MAUREY V-PULLEYS
 MAUREY MANUFACTURING CORP.

For the
BEST SERVICE
on the
BEST REGISTERS



H & C No. 75 — with the incomparable TURNING BLADE VALVE provides more thorough air distribution than any other A.C. Register. The Ace of all Deflecting Type Registers.

... Purchase in Conformity with the H & C Standardization Program

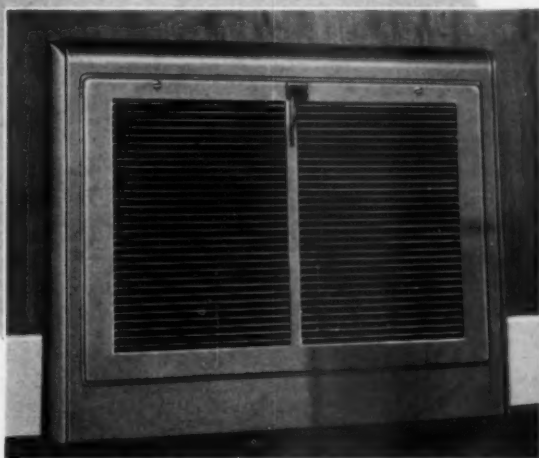


No. 210 "NO-FLEX" Floor Register — In this register you obtain extra sturdiness, extra attractiveness — at the cost of the ordinary floor register.

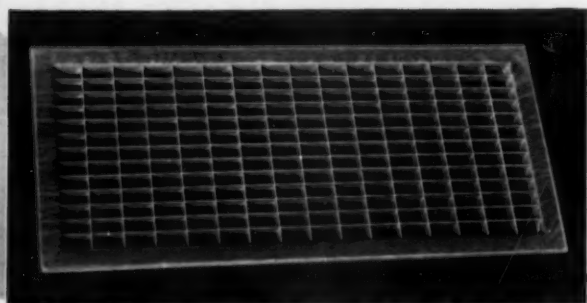
Bulletin S-95 of January 1, 1945 shows the H & C simplified line for war and postwar times. All essential items are included. Demands on our facilities are such that you will assure yourself the best possible service by ordering strictly in conformity with Bulletin S-95.

Though manufacturing difficulties are great, the quality of all H & C items remains just what you have always expected from H & C — the finest known to the trade. When better registers are made, H & C will make them.

Items now being manufactured: Gravity Nos. 210, 265, 130, 330, 345, 623, 653 and 550. A. C. Designs 74, 75 and 88. Also complete accessory line. See catalog 42 and Bulletin S-95 for details. Ask your jobber or write us for Bulletin S-95 if you do not have a copy.



H & C No. 130 — THE baseboard register for Gravity or Conversion. To get best service order as follows: No. 132 $\frac{1}{4}$ ML-10 x 8 for 8" pipe; No. 132 $\frac{1}{4}$ ML — 12 x 8 for 9" pipe; No. 133 $\frac{1}{4}$ ML — 12 x 9 for 10" pipe; No. 135 $\frac{1}{8}$ ML — 13 x 11 for 12" pipe.



H & C No. 265 "NO-FLEX" Return Air Face — exceptional strength and rigidity. Neat and trim, as sturdy as its name indicates. 84% Free Area.



HART & COOLEY MANUFACTURING CO., HOLLAND, MICH.
World's Largest Manufacturers of Registers, Grilles and Furnace Accessories



Let's Have A Talk About Furnace Cement

"I don't suppose there is a furnace man in the country who doesn't know that Tharco Asbestos Furnace Cement when used by furnace manufacturers is a mark of highest quality . . . when a furnace manufacturer is 'fussy' enough to use Tharco you may be sure he has been equally careful about quality in all other details.

Tharco Asbestos Furnace Cement stands up because it is made from the finest materials, by an exclusive Armstrong formula and processed to just the right, easy working consistency for quick, smooth application and for longest service under toughest conditions.

Tharco repair jobs, like Tharco new jobs, give greatest customer satisfaction. That is why experienced furnace men insist upon Tharco quality all the time. When you use Tharco you'll reduce complaints and call-backs and thus make money on every Tharco job."

Your workmanship can be no better than the materials you use. Why compromise with unreliable furnace cement? Use time-tested Tharco for best results!



Ask for a free copy of the valuable folder, "The Proper Use and Care of Furnace Cement". It will save time and money for you!

THARCO

Asbestos Furnace Cement

THE ARMSTRONG COMPANY

241 South Post Avenue
Detroit 17

4065 So. LaSalle St.
Chicago 9

319 So. Crowder St.
Dallas 1

GET READY NOW

—FOR A CHANCE TO MAKE REAL PROFITS!

● There's going to be a bigger-than-ever market for stainless sheet metal work after the war—every indication points to it.

And the sheet metal contractors who are prepared to handle it will reap the harvest of profits.

Here are two books which will help you to get ready: "The Fabrication of Republic ENDURO Stainless Steel" and "The Welding of Republic ENDURO Stainless Steel."

Both books contain detailed information

and recommendations on the various methods of fabricating and welding stainless steel. In them you'll find useful tables to assist you in your work.

Thousands of these books have been distributed to users of stainless steel. If you have not received copies or if yours have been mislaid or lost during the war, write us today for either or both books.

REPUBLIC STEEL CORPORATION

Alloy Steel Division • Massillon, Ohio

GENERAL OFFICES • CLEVELAND 1, OHIO

Export Department: Chrysler Building, New York 17, N. Y.



Republic

ENDURO STAINLESS STEEL



Other Republic products include Black,

**Yes Sir! For
About 30 Years
I've Owned A
RUDY**



EVEN FINER PRODUCTS FOR THE WORLD OF TOMORROW



DEALERS: Here's a product with years of testing... and thousands of friends.

This customer good-will, which is the culmination of over 30 years of quality furnace designing and building, is no small part of the value in the Rudy franchise. The greatest proof of Rudy's engineering skill and "comfort" design is the thousands of happy and satisfied Rudy owners. Their sincere endorsement of the line you sell makes your work a genuine pleasure—and more profitable, too! Tie up with Rudy now for greater sales tomorrow.

Write for franchise details today.

**AFTER THE WAR, RUDY WILL BE
READY WITH AN EVEN FINER LINE**

INCLUDING

FORCED AIR HEATING EQUIPMENT

Coal Fired • Gas Fired • Oil Fired

GRAVITY HEATING EQUIPMENT

Coal Fired • Gas Fired • Oil Fired

BLOWERS

OIL BURNERS

HUMIDIFIERS

STOKERS

WATER HEATERS

HEATING ACCESSORIES

FURNACE COMPANY • DOWAGIAC, MICH.

AT THE FIGHTING FRONTS

Niagara Machines for sheet metal work are
servicing Allied fighting equipment at
training bases and repair depots on
the fighting fronts of the world.

They are also keeping pro-
duction wheels turning in
war plants dependent on
productive machines
for shearing . . .
blanking and
forming.

**BUY WAR
BONDS**

NIAGARA

NIAGARA MACHINE AND TOOL WORKS
BUFFALO, N. Y.

District Offices:

CLEVELAND • DETROIT • NEW YORK

WEIR-MEYER

FINER EQUIPMENT FOR ALL FUELS • COAL • GAS • OIL



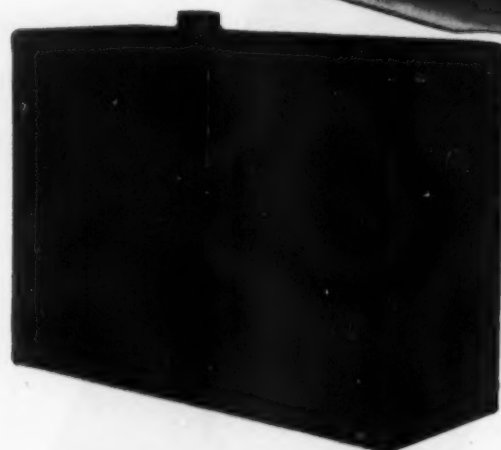
WEIR U Series STEEL FURNACE

Famous WEIR riveted and welded construction. Exclusive, entirely new features.



MEYER Gas-fired AIR CONDITIONER

Built for efficiency and durability. Easy to install. Finer performance Greater convenience.



MEYER Oil-fired AIR CONDITIONER

Gives the user of oil a new conception of cleanliness, efficiency, economy of operation.

PLANNING AHEAD

THERE'S still a job to be done supplying Military and other war needs. Naturally, we'll do it as—and to the best of our ability. However, more of our capacity constantly becomes available for civilian needs.

WEIR-MEYER equipment for MODERN HEAT is truly modern. In principle, engineering, design, and construction, it incorporates new and better methods and ideas.

The famous "beyond competition" performance and long life of WEIR-MEYER equipment remain as sales features exclusive to WEIR-MEYER distributors and dealers.

ESSENTIAL FACTORY POLICIES

WEIR-MEYER policies of distributor-dealer cooperation that have proved so satisfactory in the past are being maintained. New equipment serves to increase the value of the WEIR-MEYER business.

Leadership is a habit with WEIR-MEYER. You can depend on a modern line of equipment for Modern Heat that will be complete. In every way it will make sure the traditional top position that WEIR-MEYER has won and held over the years.

WHO MAKES IT, MAKES A DIFFERENCE

MEYER FURNACE COMPANY

PEORIA 2,
ILLINOIS

MANUFACTURERS OF WEIR AND MEYER FURNACES, AIR CONDITIONERS
FOR **COAL • GAS • OIL**

R. Modern Heat

MEANS

OIL · GAS



Since 1886



WEIR R Series STEEL FURNACE

A thoroughly dependable HEAVY DUTY unit for gravity or forced air applications.



**WEIR 500 Series
HEAVY DUTY System**

Forced air for schools, churches, warehouses, and other large spaces. May be used in batteries.

If you would serve your community better—and profitably—find out what WEIR-MEYER Modern Heat can mean to you. You may be in "open" territory.

CLIP IT! ➔

THE MEYER FURNACE CO. PEORIA 2, ILLINOIS

Gentlemen:

I am interested in WEIR-MEYER Modern Heat. Please send complete facts about your ☐ distributor ☐ dealer proposition.

NAME _____

COMPANY _____

ADDRESS _____

GAS

OIL

COAL



Mueller Series G-90 Gas-Fired Gravity Furnace — Highly efficient up-draft design. Round or square casing.



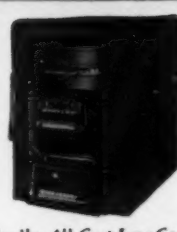
Mueller Series CVP All-Cast-Iron Gas-Fired Winter Air Conditioner — Compact cabinet for utility room or basement.



Mueller Series 50 Oil-Fired Winter Air Conditioning Furnace — Small size with either vaporizing or pressure atomizing burner. Two larger sizes with pressure burner only.



Mueller Coal-Fired Cast-Iron Furnace — Cast iron, gravity type.



Mueller All-Cast-Iron Coal-Fired Winter Air Conditioner — All parts completely enclosed in one cabinet.



Mueller Series SHP Steel Gas-Fired Winter Air Conditioner — Attractive, compact cabinet type for utility room or basement.



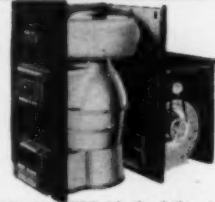
Mueller EPS Gas-Fired Winter Air Conditioning Furnace — Sectional type forced-air units. For residential usage.



Mueller Series OVP Vertical Oil-Fired Winter Air Conditioner — Equipped with Mueller vaporizing burner. Burner and controls enclosed.



Mueller WG-42 All-Cast-Iron Coal-Fired Gravity Furnace — Capacity 42,000 Btu output at register. Standard return flue radiator.



Mueller WR-72 Coal-Fired Winter Air Conditioner — Capacity 72,000 Btu output at bonnet. All cast iron. Standard return flue radiator.



New Mueller Type 20 Gas-Fired Boiler — Steam, hot water, or vapor heating. For larger residences, commercial and industrial buildings.



New Mueller Types 10 (shown) and 11 Gas-Fired Boilers — for steam, hot water, or vapor. For residences and small commercial installations.



Mueller Series OHP Horizontal Oil-Fired Winter Air Conditioner — Equipped with Mueller Vaporizing Burner. Burner and controls exposed.



Mueller Double-Radiator Furnace — Gravity type. Tubular design — heavy cast-iron construction.



Mueller Double-Radiator Furnace — forced-air type — Tubular design and heavy cast-iron construction.



Mueller Gas-Fired Unit Heaters — Space-heating unit for factories, warehouses, hangars, shops.



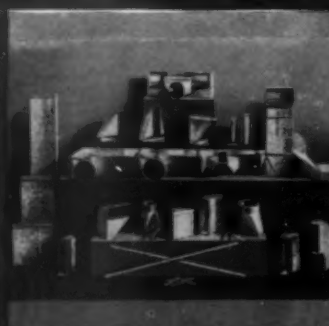
Mueller Stoker-Fired Furnace — forced-air type. No fly ash accumulations, integral clinker chute.



Mueller Coal-Fired Steel Furnace — Gravity type.



Mueller Steel Coal-Fired Winter Air Conditioner — All parts completely enclosed in one cabinet.



Keep pace with the changes of the years —
 — a rush of remodeling, including furnace replacements
 — the start of America's greatest building program
 ...with a furnace line that is really complete

that's MUELLER

...Complete line of furnaces —
 sized and priced to meet all of your
 needs for the new building boom
 to supply you with everything
 you need from the design stage to
 the finished product — all at competitive
 prices.

...To assure you
 complete line the choice
 of the best quality
 materials and workmanship
 for the most efficient
 and economical
 operation.

the demands of the post-war market,
 give you service, and maintain a high
 standard of quality.

... **Engineering research** to keep
 you abreast of the times and ahead of
 competition, with constant improve-
 ments and new models.

... **Reputation** to make your selling
 job easier — to back you up with the
 prestige of a nationally-advertised

pective market for millions of new homes
 during the next ten years.

With the Mueller line, you know exactly
 where you stand. It's all there, on the
 record. You can be sure of meeting re-
 quirements — sure of an edge on com-
 petition—sure of performance that builds
 your reputation.

Tie up with Mueller for the long pull
 ... and make every 1945 installation count
 toward a prosperous future. **L. J. Mueller
 Furnace Co., 2010 W. Oklahoma Ave.,
 Milwaukee 7, Wisconsin.**

D-45



Climatron
 CLIMATE CONTROL

MONCRIEF-50

... OLD IN EXPERIENCE

FOR 50 years Moncrief has been building a leading line of warm air heating equipment.

Moncrief's policy — to build products that are soundly engineered — efficient in operation — long lived. Moncrief has always been a leader in modern design and construction. Moncrief has always given the biggest dollar value possible.

During the gigantic war program, great strides have been made in manufacturing and produc-

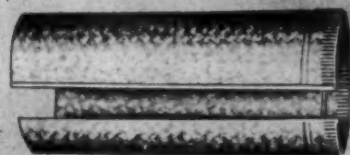
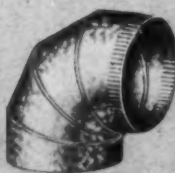
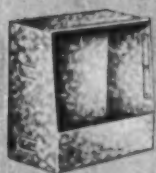
tion methods. To meet their commitments in this program, Moncrief production facilities have been tremendously increased — modern, time-saving machines have been installed — modern production methods employed.

After victory — when restrictions and limitations have been lifted — Moncrief will swing into greater volume production than at any time in its 50 years.



WARM AIR FURNACES
FURNACE PIPE • FITTINGS
AIR CONDITIONING UNITS
FOR COAL • GAS • OIL

MONCRIEF PIPE and FITTINGS



Moncrief Fittings Fit . . . They're Machine Made

MONCRIEF FITTINGS CUT INSTALLATION HOURS

Years of History

MODERN IN VISION

PLANT • GENERAL OFFICES at Medina, Ohio



THE PRE-WAR LINE OF MONCRIEF FURNACES . . . AIR CONDITIONING UNITS



Series C
Coal Fired Cast
Gravity Furnace



Series 600
Coal Fired Steel
Gravity Furnace



Series C
Coal Fired Cast
Gravity Furnace



Series S
Coal Fired Cast
Air Conditioning Unit



Series G
Gas Fired Cast
Air Conditioning Unit



Series GG
Gas Fired Cast
Gravity Furnace



Series HDG
Gas Fired Cast Utility
Air Conditioning Unit



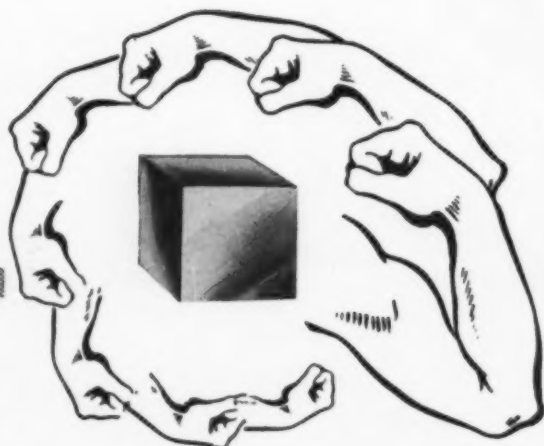
Series Special
Oil Fired Steel
Air Conditioning Unit

THE HENRY FURNACE CO.

Medina, Ohio

★ **HYDRAULIC-ACTION...**

because



EXPANSION and contraction of a metal with heat and cold is definite and exact. With each degree of temperature the amount of expansion is exactly the same.

A tube or pipe completely filled with liquid is comparable to a solid-metal bar. The rate of expansion or contraction of the liquid, like that of the bar, is definite and predictable.

Hydraulic-Action, an exclusive feature of White-Rodgers temperature controls, gives *positive* action at every degree in the range of temperature for which it is designed.

8 EXCLUSIVE FEATURES OF WHITE-RODGERS HYDRAULIC-ACTION TEMPERATURE CONTROLS

1. May be mounted at any angle or position, above, below or on level with control point.
- ★ 2. Hydraulic-Action Principle incorporating solid-liquid-filled bulb and capillary provides expansion force comparable to that of a metal bar.
3. Diaphragm motion uniform per degree of temperature change.
4. Power of solid-liquid charge permits unusually sturdy switch construction resulting in positive contact closure.
5. Heavier, longer-wearing parts are possible because of unlimited power.
6. Dials are evenly and accurately calibrated over their entire range because of straight-line expansion.
7. Controls with remote bulb and capillary are not sensitive to change in room temperature. Accuracy of control is not affected by temperature changes in surrounding area.
8. Not affected by atmospheric pressure. Works accurately at sea level or in the stratosphere without compensation or adjustment.



gives you **POSITIVE ACTION**

solid-liquid-filled bulb and capillary provide expansion force comparable to that of a solid-metal bar.

HYDRAULIC-ACTION

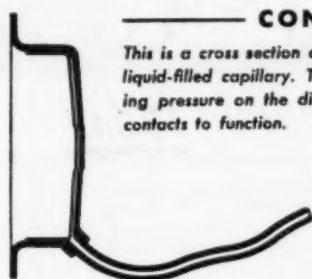


... how it works



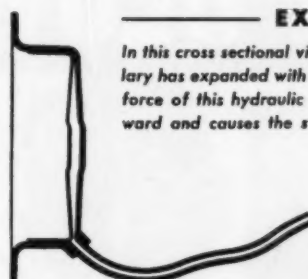
Ever see a frozen water pipe? The terrific force of the expansion of the water cracks the strong iron pipe as effortlessly as you would tear a sheet of paper.

The diagrams below picture the action of the solid-liquid charge in actuating the diaphragm that opens and closes the switch mechanism of the control.



CONTRACTED

This is a cross section of the diaphragm and part of the liquid-filled capillary. The liquid has contracted, releasing pressure on the diaphragm and causing the switch contacts to function.



EXPANDED

In this cross sectional view, the liquid charge of the capillary has expanded with a rise in temperature. The positive force of this hydraulic action forces the diaphragm outward and causes the switch contacts to function.

Actual size illustration of the White-Rodgers Hydraulic-Action diaphragm body, the actuating element of every White-Rodgers temperature control. It is so designed as to exert full pressure at the point of contact with the switch mechanism.



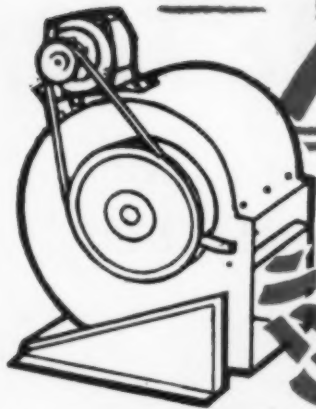
WHITE-RODGERS ELECTRIC CO.

1215A Cass Avenue



St. Louis 6, Missouri

Controls for Heating • Refrigeration • Air-Conditioning



FORCED AIR PROFITS

can send you to
Florida next year

If you're Smart!



HERE'S WHY YOU'LL PROFIT

- 1 **MARKET TREMENDOUS.** Over 9 million furnaces. Every single gravity furnace is ripe for forced air heat.
- 2 **VIKING EFFICIENCY** makes a far superior blower. With it any furnace can be adapted to modern Winter Air Conditioning.
- 3 **VIKING SALES HELPS** make selling easy. You get literature and displays to help you sell your customer and to help you dig up new leads too.



BY SMART we mean simply this. If you learn what Forced Air Heating is, how it works, how to sell it, you will be smart in the field and you'll cash in handsomely in the next five years. There is a tremendous market waiting for Winter Air Conditioning and its comforts and if you're ready, you'll make money selling it. Viking helps you with specially designed literature in the form of a training program which you can study at home in your spare time. It consists of a bi-monthly house magazine, "The Conditioner," a post-war Planning File and special mailings of educational and product literature which will help you sell Winter Air Conditioning. To get this valuable free material simply fill in the coupon below and mail at once.

See How We Train You Now At No Cost to BE A BLOWER DEALER!



This installation view shows how easily any coal, oil or gas fired gravity furnace can be converted to Winter Air Conditioning at a profit to you of \$50 or more per installation.



FRAM HEATING CO.

Robt. Fram

*Best ammunition
to help me sell
winter air conditioning....
Invaluable
to blower
dealers*



SEND COUPON TODAY

Viking Air Conditioning Corp., 5600 Walworth Ave.
Cleveland 2, Ohio Dept. A

Send at once Planning File, back issues
"Conditioners", educational literature.

Name

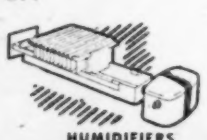
Address

City State

Any furnace can be adapted to Forced Air Heating with a Viking Blower

Viking

IN PEACETIME, PRODUCERS OF:



AIR CONDITIONING CORPORATION • 5600 Walworth Avenue • Cleveland 2, Ohio



THE BURNER'S THE CENTER of KRESKY Performance



KRESKY Patented OIL BURNER

When Kresky replaced natural draft with patented mechanical induction of air, it revolutionized oil burner design.

It did away with the soot, the smoke, the incomplete combustion and the waste that are unavoidable with natural draft. And, it introduced a long, clean, intensely hot flame that leaves no soot, makes no smoke, and extracts the utmost in fuel value.

Now is the Time to Clinch A Kresky Distributorship

Kresky will soon have civilian production in full swing. We are building a nation-wide distributor organization and getting ready to supply Kresky appliances at twice our pre-war capacity. They include:

SPACE HEATERS—Domestic and commercial.

FLOOR FURNACES—Three types in both dual wall and floor register models.

CENTRAL HEATING—Four models of basement and utility room furnaces.

WATER HEATERS—Storage and auxiliary types.

Every item is a basic essential and in widespread demand. And each is equipped with the patented Kresky Burner.

Distributors who want a well established line with an assured turnover, and dealers who are interested in stocking the Kresky line are invited to write for price lists and full particulars.

Kresky Burners are standard equipment with many manufacturers of a wide variety of oil burning appliances:

Stoves
Ranges
Heaters
Furnaces
Hot Water Heaters
Heating Systems
Bake Ovens
Steam Boilers
Hot Water Boilers
Press Boilers
Candy Kettles
Doughnut Kettles
Melting Furnaces
Vulcanizing Machines
and many others.

KRESKY MANUFACTURING CO.

Pioneers in Oil Burning Equipment Since 1910

PETALUMA

CALIFORNIA



IN POSTWAR... IT WILL BE
Gas Heating
 FOR GAS HEATING... IT'S BRYANT

Study the postwar building surveys that measure the nation's preferences on types of heating equipment, and you will discover they indicate a growing preference for automatic gas heating. Question a few of the people you serve, and you will find that the best-known name in gas heating is Bryant... a reputation won by past performance.

Producing for war has not prevented progress in perfection of Bryant equipment for postwar. Bryant research and development laboratories, now with more scientific ability than ever before, promise product improvements that are practical, proved and salable... modern gas heating equipment which you can recommend, specify and install with confidence. In postwar as in days gone by... it will be best to "let the pup be furnace man."

★
 THE BRYANT
 HEATER COMPANY
 17825 St. Clair Avenue,
 Cleveland 10, Ohio
One of the Dresser Industries
 ★



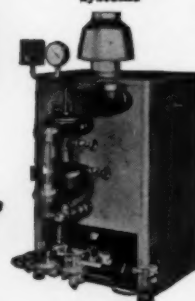
bryant
 GAS
 HEATING

LET THE PUP BE FURNACE MAN



Bryant Model VB
 Vertical Type
 Winter Air
 Conditioner

Bryant Model 23
 Boiler for steam
 systems



Bryant Model 94
 Gas Conversion
 Burner

Bryant Model 26
 Boiler for hot
 water systems

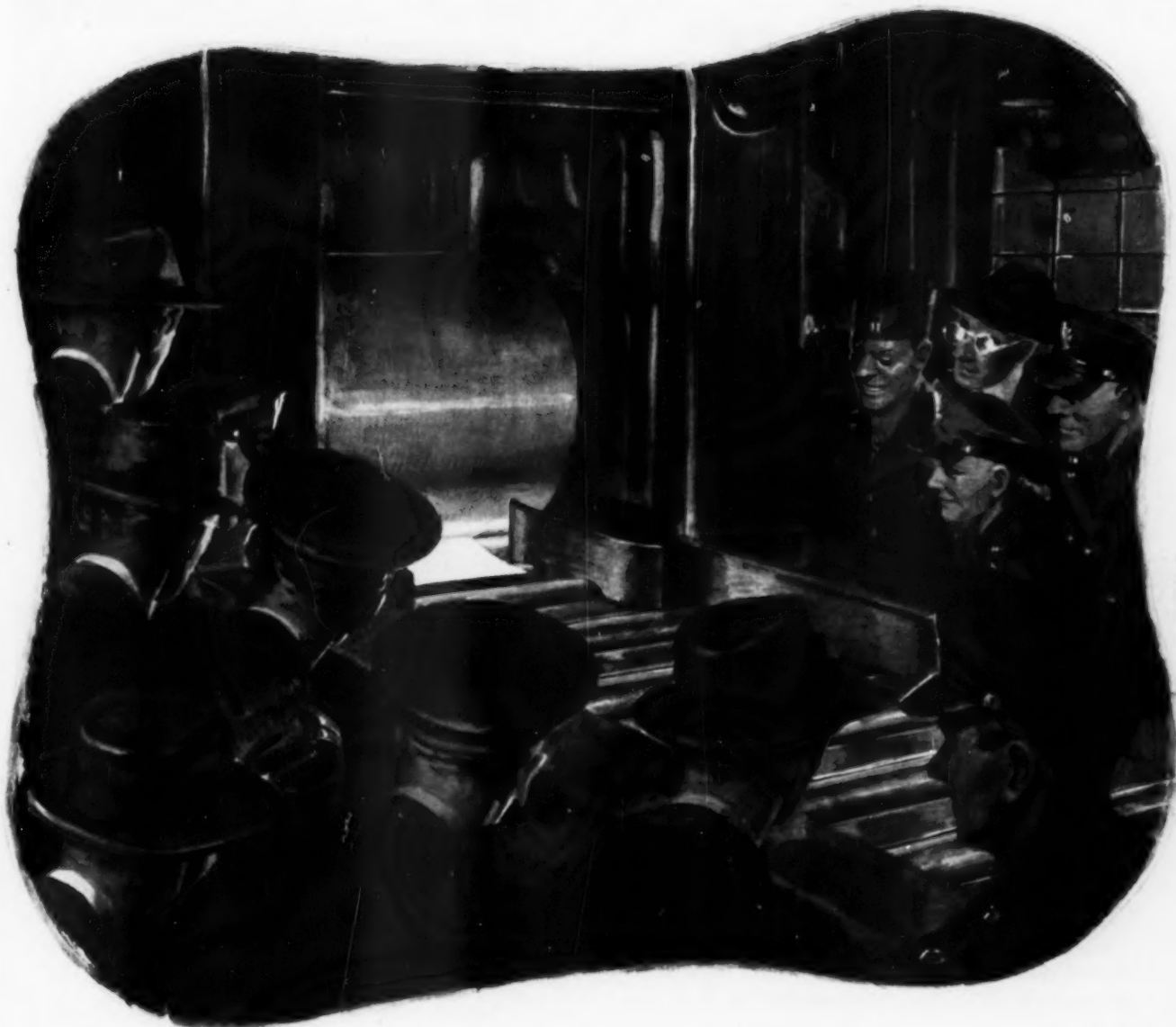


Bryant Model 85
 Gas-fired Unit
 Heater

Bryant Model
 GF-56 Warm Air
 Furnace



Bryant Model
 BA-88 Winter
 Air Conditioner



Rolling the Impossible

ON A SPLIT-SECOND SCHEDULE

"Tough jobs," said the Colonel, "are expected, but this one is virtually impossible. It means rolling to practically a zero tolerance . . . Other mills say, *it just can't be done.*"

How Weirton meets such requirements is a story of unbelievable precision—an amazing report of perfect integration between advanced industrial thinking and remarkable facilities—the same "know how" that overnight

made Weirton the sixth largest U. S. producer of rolled brass—the *only* mill ever able to adapt ponderous steel equipment to this delicate operation.

Again, it was Weirton that solved the problem of rolling magnesium in extremely thin gauges. They went to Weirton too, when an important war application required the rolling of silver chloride into plastic-like slabs . . . All in all, Weirton has developed and

manufactured ten entirely new, vital products since Pearl Harbor.

These examples of difficult rolling are introduced merely to show the extreme accuracy possible with Weirton's equipment and to illustrate the experience and ingenuity of Weirton's people . . . a winning combination that has already translated itself into remarkable improvements in hundreds of home-front products.

WEIRTON



STEEL CO.



WEIRTON, WEST VIRGINIA • Sales Offices in Principal Cities • Division of NATIONAL STEEL CORPORATION Executive Offices, Pittsburgh, Pa.

Your **BUSINESS**
IS CHANGING, TOO!



New housing . . . modernization . . . replacement of antiquated furnaces and boilers—all add up to a huge demand for new automatic heating, cooling and year 'round air conditioning equipment. The successful dealers will be the ones who take profitable advantage of the trend and offer all of the modern indoor comfort products for the home.

Now — Year 'round Sales and Profits

In the Viking line the contractor-dealer has a

**THE VIKING
PLAN OF DISTRIBUTION**

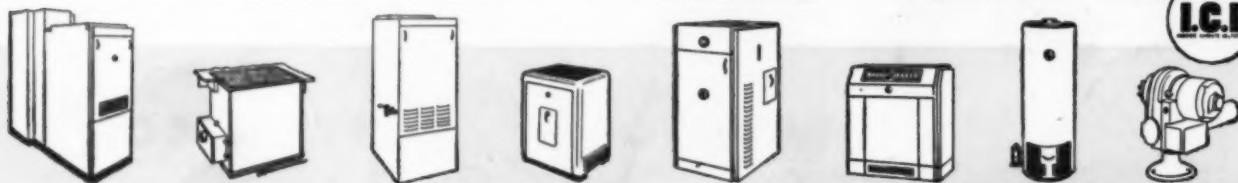
Makes it practical for dealers to earn year 'round sales and profits because the conveniently located Viking Wholesale Distributor carries the full line of Viking units and parts, in addition to all of the customarily needed installation materials. His engineering, warehousing and delivery facilities can be of invaluable assistance to you.

product for every buyer—business for every month in the year.

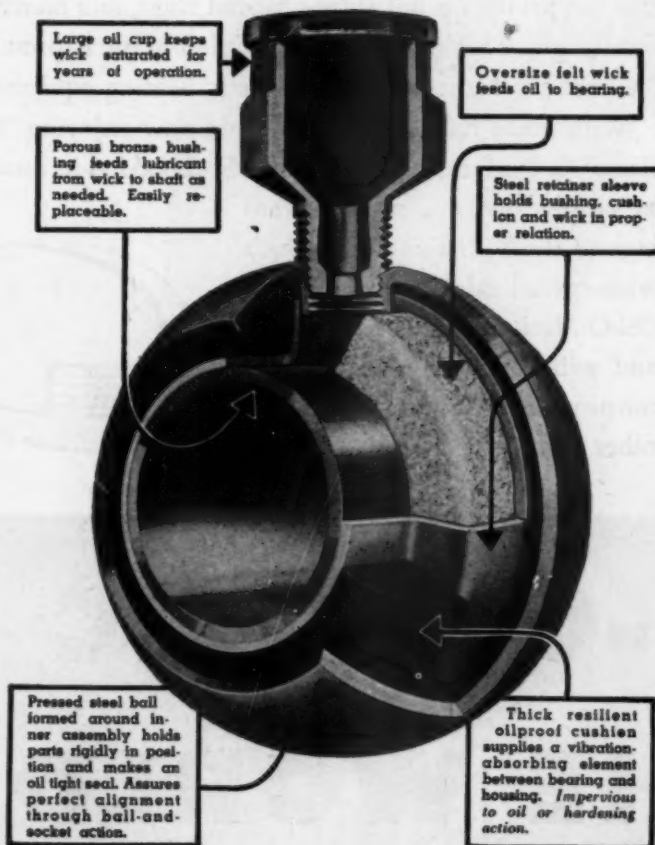
Automatic heating, cooling and year 'round air conditioning are the foundation of the Viking dealer's business. Rounding out the line are oil and gas fired automatic floor furnaces . . . efficient space heaters in modern cabinets . . . console and window ledge room coolers . . . gas and oil fired boilers for panel and radiator heating . . . condensers for refrigeration and cooling . . . conversion oil burners and automatic oil fired water heaters.

Your business will grow with the industry's progress if you get in position to supply the equipment your customers will demand. Look into the Viking proposition today.

VIKING
MFG. CORPORATION
1601 U. S. Bldg, Dayton 2, Ohio



INVESTIGATE THIS BEARING for YOUR POST-WAR PRODUCTS



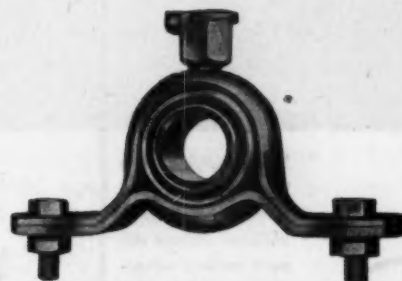
FOR air conditioning equipment—for attic fans—for blowers—for all types of devices requiring silent operation, perfect alignment and self-lubrication—the Triangle Shock-Absorbing Pillow Block should be on your list for investigation.

1. It is the only bearing for air-conditioning that has a resilient oil-proof cushion scientifically built into the bearing—for silence and vibration absorption.
2. Ball-and-socket design assure perfect alignment.
3. Scientifically streamlined for compactness, simplicity, strength and **MINIMUM OBSTRUCTION TO AIR FLOW.**

Study the large cut-away view. It shows the principal features and illustrates how Triangle engineering has created a new type of silent bearing outstandingly different from the conventional. Its design assures high efficiency and low cost operation.

While war work is still our number one job, expanded facilities enable us to also serve a limited number of commercial customers.

If you are working on product improvement—or new post-war items—furnish us the necessary facts and we'll give you complete information including quotations, on Triangle bearings to best fit your needs.



This shows a complete Triangle Pillow Block with a popular type of mounting. Several other mountings are available to fit each type of installation.

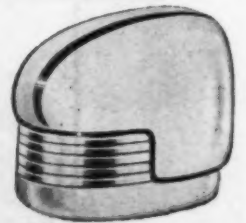
TRIANGLE MANUFACTURING CO.

392 Division Street • Oshkosh, Wisconsin



In any industry, sales leadership is significant. It indicates that the product is built right, priced right, and merchandised right. That's why Williams Oil-O-Matic is proud to lead the world in sales of automatic heating equipment.

With more than a million people now enjoying Williams Oil-O-Matic heat, every neighborhood has its nucleus of satisfied users... a real advantage to the Williams dealer. Such wide-spread sales mean, too, that Oil-O-Matic dealers have made and will continue to make more money than dealers with any other line.



OIL-O-MATIC LEADS THE WORLD IN SALES

WILLIE O-MATIC says:
"As soon as paper becomes more plentiful, Williams will use still more national advertising to tell the 'full page' story of Oil-O-Matic superiority."



In its more than three years of all-out war effort, Williams has accepted only the toughest precision jobs. The fact we have received the Army-Navy Award for excellence not just once, but *four times*, is a tribute to our workers. From our war-born knowledge will come still finer peacetime products.



WILLIAMS OIL-O-MATIC HEATING

WILLIAMS OIL-O-MATIC HEATING CORPORATION • BLOOMINGTON, ILLINOIS

"They changed to Penn controls, too..."



... saw their sales manager yesterday. He agreed it was Penn on the basis of comparison . . . assured more dependable operation, greater convenience and economy."

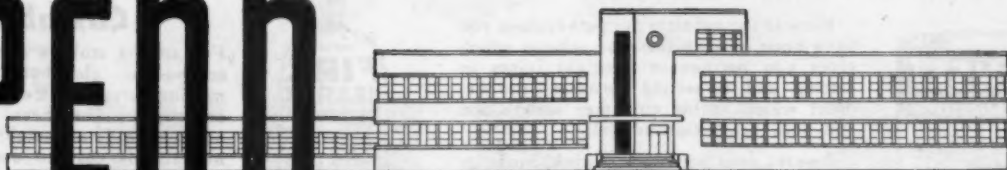
So another heating equipment manufacturer, with his fingers on the pulse of Mr. and Mrs. America's needs, turns to PENN . . . to assure that extra performance. Keen, aggressive businessmen have recognized the profit advantages of *better* automatic control.

In handling products with PENN controls, you too are taking advantage of Penn's knowledge and ex-

perience. Penn's engineering skill will help you reach new heights of customer acceptance. Penn's superior design will help you build and protect your reputation for quality.

So don't be satisfied with "something just as good." In the postwar market, ask for—and insist on—heating equipment with PENN Automatic Controls. You'll see the difference in your profits and in customer satisfaction. *Penn Electric Switch Co., Goshen, Ind.* Export Division, 13 E. 40th St., New York 16, U.S.A. In Canada: *Powerlite Devices, Ltd., Toronto, Ont.*

PENN



AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS

FIRELINE

*saves castings - saves labor
saves fuel - saves money*

**1945
will be another
Fireline year**

UNQUESTIONABLY there are more furnaces needing firepot repairs today than ever before. But if you are still following the old course of tearing down the furnace and putting in hard-to-get castings, your business will be definitely limited by the scarcity of castings, manpower, and hours in the day.

Alert furnace men have found the way to stretch time and manpower. They have done something they should have done long ago: They have adopted the Fireline method of repairing firepots. They have found that Fireline has enabled them to give the furnace owner a better job at a lower price while actually making a greater over-all profit.

REPAIRS CRACKED FIREPOTS

Fireline repairs cracked and burned-out firepots—without new castings—without dismantling the furnace. Fireline is high-quality refractory moulding material in

● Furnace firepot lined with Fireline, showing the lining after it has been baked out by the fire. A modern, monolithic lining which seals broken castings, saves fuel, withstands 3000 deg. F.

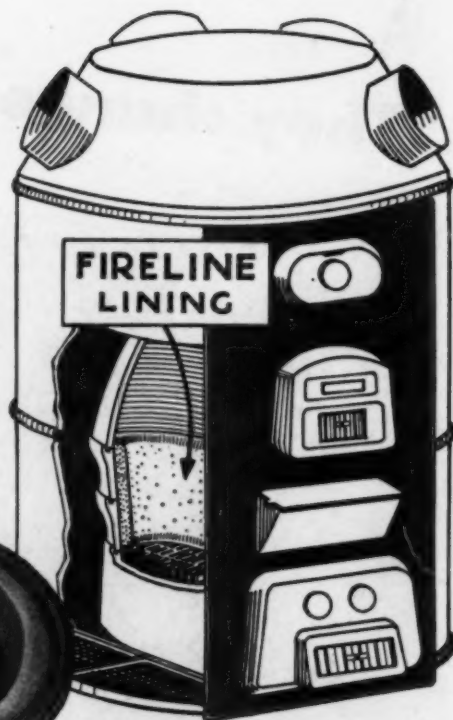


moist, plastic form which is installed as a complete lining entirely around the firepot. The fire bakes it into a monolithic lining which withstands temperatures up to 3000 deg. F. and which seals the castings gas-tight—prevents the escape of gas, odors, and soot into the building.

A Fireline lining can be installed right in the middle of winter. It takes only a few hours to do the job. The fire can be rebuilt immediately after installation.

MORE HEAT FROM LESS FUEL

A Fireline lining produces more heat from less fuel. This modern refractory lining reflects and radiates the heat across the entire fuel bed—produces a hotter fire, reduces ash, produces better combustion of all combustible matter; holds the fire better overnight. Even if in good physical condition, every warm-air furnace needs a Fireline lining to save fuel and protect the firepot castings.



Average Furnace Requires 100 lbs.

● Fireline is installed 1 to 1½ in. thick. The average 22 to 24 in. furnace requires 100 lbs. for a complete lining entirely around the firepot. Also used to replace fire brick.

Fireline is packed in 100 lb. drums containing ¾ cu. ft. Also packed in 50 lb. pails for lining heating stoves, circulating heaters, etc.; and in 5 and 10 lb. cans (60 lbs. per case) for repairs, cook stoves, water heaters, etc.

Fireline is your big opportunity for 1945. It is always immediately available; complete instructions with every drum. Keep a drum on the truck at all times for emergency repairs—quick profits throughout the year.

Fireline is stocked by leading jobbers everywhere. Ask your jobber for prices and discounts or write us for free bulletin including table of quantity required for furnaces of various sizes.

FIRELINE STOVE & FURNACE LINING CO., 1816 Kingsbury St. (Dept. A), Chicago 14, Ill.

IRONSET Furnace CEMENT



Packed in 5 and 10 lb. cans; 60 lbs. per case.

Here is the asbestos furnace cement you have been looking for—the cement which gives you permanent gas-tight joints in setting and re-setting furnaces—the cement which builds customer satisfaction and your reputation as well.

Ironset does not crack, shrink, bloat, or blister—withstanding higher temperatures. Remains pliable and elastic after long service. Try it for your next furnace job and see for yourself.



FIRE-HEARTH Castable

For setting stokers and oil burner combustion chambers. Also for making furnace baffles and pre-cast combustion chambers. This economical grade of castable refractory material is easy to use—just mix with water, pour into place, and smooth with a trowel. It sets without heat. Packed in 50 and 100 lb. bags.

Can you Sell a Deal Like This?



***20% SAVING
ON FUEL ALONE**
...Besides Enormous Amount
of Man-Hours

"...Previous to the time we installed this stoker, we had a considerable amount of lost time due to temperature reduction at night. It required several hours for us to bring up the heat in the morning, so that our press cylinders would be sufficiently warmed and the ink in our presses would flow satisfactorily.

"After the Winkler Stoker was installed, we were able, without additional labor, to maintain proper night temperature, so that full production could be resumed upon the arrival of our men in the morning.

"After going through the past season, we have found that we are saving 20% in fuel as compared to hand firing, besides the enormous amount of man hours saved in our production by having this uniform temperature.

"Due to the satisfaction we received from this stoker, we have placed the order for a stoker to be installed in our other building."

THE SALE LITHOGRAPH CO.

Winkler files are packed with testimonials from delighted owners... all available to help Winkler distributors sell

If you like to measure profits in dollars instead of pennies, find out *now* about the Winkler Stoker Franchise. This is the "Golden Age" of stoker merchandising—with every condition right for hard-hitting distributors to make a clean-up. The benefits of stoker firing are today so widely recognized that selling opportunities are boundless—and the bars are down! All you need to tap a golden flow of profits is the *right* stoker, backed by a genuinely sales-minded organization. *Winkler offers both!*

Winkler Stokers have the features which make buyers out of prospects

Only the Winkler has a *fully automatic* transmission—endowed with *extra power* and longer life. The Winkler Econo-miser Burner is noted for refinements of engineering which minimize segregation of coal sizes, provide for correct air distribution and improve combustion efficiency. The heat content of the coal is fully utilized—that's why Winklers make economy records.

WINKLER PROVIDES THE SELLING TOOLS

Supporting the mechanical excellence of Winkler Stokers is the thorough training in Winkler selling methods which enables you to develop your profit opportunities to the fullest. The Winkler Franchise includes participation in the Winkler Two-for-One Advertising Bonus Plan which gives you twice the usual amount of *personalized* local advertising.

Winkler distributors make money from the start *because they are shown how!*



Winkler Stokers for homes, apartments, commercial and industrial buildings can now be installed without priority approval.



WINKLER
fully automatic **STOKERS**

U. S. MACHINE CORPORATION • LEBANON, INDIANA



START 1945 *with the* REGISTER LEADERS

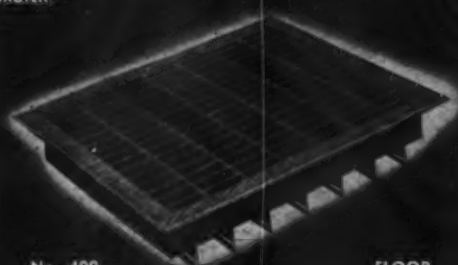
These U.S. Registers in standard styles and sizes comply completely with the recommendations of the National Warm Air and Air-Conditioning Association for 1945 production.



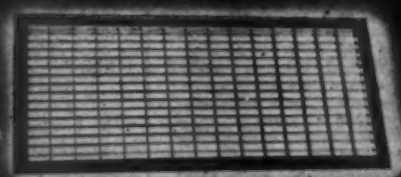
No. 40 Series Gravity Baseboard Registers
Easily adjusted grille bars, non-vision interior, two piece construction with center attachment buttons. Sidewall intakes to match.



PANAMA Baseboard Registers . . . Neatest of the inexpensive baseboard registers — embossed bars — two-piece style with removable center — provides maximum capacity — sidewall intakes to match.



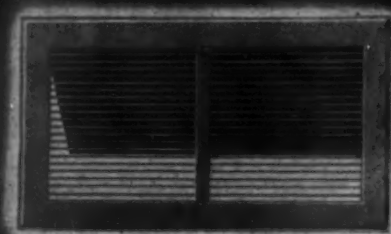
No. 400 TRUSSTEEL FLOOR REGISTERS
Valves run short way — keep walls cleaner — easier to operate — heel proof mesh — seamless corners.



No. 405 TRUSSTEEL COLD AIR INTAKES . . . Sturdily built — heel-proof mesh — same seamless corners as No. 400 for easy snug-fitting installations — like No. 400 comes in Oak Grain and other permissible finishes.



No. 256 4-WAY FLOW A-C Registers DEFINITELY COMPLY with National Warm Air and Air-Conditioning Ass'n specifications — give you complete range of directional flows.



No. 153 LOUVRE TYPE A-C Registers . . . Ideal installations for the moderate or low cost type of home — close non-vision design, perfect lever operation, straight or down flow as desired.

Abide by the industry's production recommendations in ordering your 1945 registers. By complying with the standard sizes it will enable you to secure better service and decrease inventories. Write for Complete Catalogs — 41-AC Air Conditioning Registers, 41-G Gravity Registers, 41-F Pipe and Fittings.

UNITED STATES REGISTER CO.
BATTLE CREEK, MICHIGAN
MINNEAPOLIS • KANSAS CITY • ALBANY

Your Post-War Plans Are Already Made

. . . When it comes to Humidifier Water Control

THE NEW MCDONNELL *Snap Action* FLOAT VALVE

WE never started on a job that looked easier, or proved tougher, than the making of a dependable float valve for the humidifier pan of warm air furnaces.

When we brought out the McDonnell Humidifier Water Control back in 1939, we thought we had the problem completely licked. As a matter of fact we *did* make a big improvement over the old type of float valve — the kind that slowly cracks open when the float drops and simply dribbles water into the pan. This seeping or dribbling action wasn't sufficient to keep the valve orifice clear and prevent lime or dirt from plugging up the valve. So the basic problem was to design a full-flow valve.

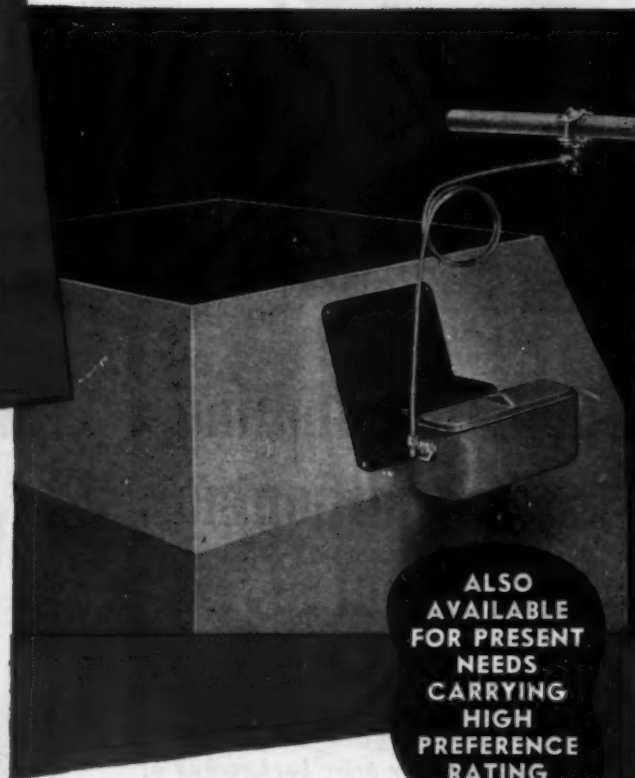
Our "snap action" valve accomplished this. It was designed to snap wide open whenever the float dropped a quarter-inch. The full stream sluiced out the orifice — kept the valve in good operating condition. But while it represented a big advance over the old way, we frankly admit that there was still room for improvement.

We like a tough problem of this kind; so we have sailed into it in dead earnest. The period when production was practically stopped proved an excellent opportunity for intensive research, field studies, and re-designing. As a result, the "snap action" has now been brought to a remarkable stage of perfection; a new type of float with better action has been developed; many fine-spun changes have been made that truly achieve a new standard.

MCDONNELL & MILLER

1318 Wrigley Building, Chicago 11, Illinois

Doing One Thing Well



ALSO
AVAILABLE
FOR PRESENT
NEEDS
CARRYING
HIGH
PREFERENCE
RATING



No. 517, consisting of No. 417
Float Valve with rugged die
cast float chamber and cover.



No. 417 Snap Action Float
Valve for installation in hu-
midifier pan or float chamber.

Look to

CLARAGE

For Air Handling and Conditioning Equipment . . .

What we've done in research and manufacturing to meet the vital needs of war, *plus our prior background of long experience*, makes Clarage especially well-equipped to solve your air handling or air conditioning problems.

If you have an immediate problem, look to Clarage NOW for highly efficient units, expertly designed and built for your particular job.

Or if you're thinking in terms of postwar service, look to Clarage NOW for any desired planning and cost-determining assistance . . . so that when the time comes, your installation may be completed without delay and may incorporate the latest improvements in air handling or air conditioning.

**Shown are but a few of the many types of units available. Write for our catalog describing the complete line.*

COMPLETE AIR CONDITIONING



For industrial, commercial and public building needs, Clarage builds both central station and unit air conditioners—suitable for complete conditioning, heating or cooling, humidifying or dehumidifying.

The unit conditioners (floor and suspended types) can be easily installed without costly building alterations; used with or without duct work.

VENTILATING FANS



Clarage Fans for ventilating, cooling, heating and air conditioning are made in 28 sizes; 200 to 100,000 c.f.m. There are two types: slow speed for belt drive, and high speed for direct motor drive.

Standard equipment includes self-aligning, dust-proof, oil-tight bearings. Fan wheels are both statically and dynamically balanced, insuring quiet, trouble-free operation.

UNICOIL CONDITIONING UNITS



Clarage Unicoil Units combine in a single "package" all elements necessary for efficient air cleaning and heat transfer. Easier and cheaper to install—eliminating time and expense of assembling many different parts. Widely used in central station heating, cooling and complete conditioning systems; large range of sizes.

Standard unit consists of coils, eliminator plates, settling tank and casing. Filters and spray nozzles optional.



Immediate Assistance Available in 45 Cities!



To be of maximum help to architects, engineers, contractors and industry, Clarage maintains branch offices at all the strategic points indicated on the map above.

Each Clarage branch office is manned by experts—by Clarage application engineers who know how to satisfactorily meet air handling and air conditioning requirements of every conceivable kind.

Whether you have a present or post-war problem, you will like the prompt, intelligent way in which your inquiry is handled by the Clarage application engineer in your vicinity.

For this service—which is without obligation—either dial our number in your city, or 'phone or write the factory in Kalamazoo.

* * *

CLARAGE FAN COMPANY
Kalamazoo, Michigan



LARGE AREA HEATERS

Clarage Unit Heaters are designed for service in factories, mills, etc. They deliver heat at high velocity spreading it uniformly over wide areas. Both floor (as shown) and suspended types are available.

Equipped with centrifugal fans, ball bearings, adjustable outlets, and with coils for pressures up to 200 lbs., these units effect important savings in both fuel and maintenance costs.



Eight Standard Sizes

SMALL AREA HEATERS

For heating small factory areas, buildings where heat losses are concentrated around outside walls, offices, stores, etc., Clarco Unit Heaters are recommended. Built in horizontal (as shown) and vertical types for installation along side walls or at ceiling level.

Unique design of propeller fan assures maximum heat delivery. Motor is totally enclosed, rubber mounted. Units are finished in red and black enamel—strikingly attractive. They are very quiet running.



Sixteen Standard Sizes

BOOSTER FANS

This is a complete line of small centrifugal fans for use in connection with warm air jobs, and as blowers in "package" air conditioners and in central station residential air conditioning. Capacities 200 to 5000 c.f.m. Quiet operation an outstanding feature.

Units are furnished as complete fans (with or without inlet boxes), or wheels only or wheels and housings can be supplied. Also built as duplex units.



Built in Ten Standard Sizes

EXHAUST FANS

Clarage Exhaust Fans are made to cover all kinds of exhaust, blow pipe and pneumatic conveying requirements; used for dust collecting, removing fumes, and for conveying through pipe such materials as shavings, grains, etc.

Fan wheels are statically and dynamically balanced. Famous Clarage dust-proof, oil-tight bearings standard equipment. Smaller sizes adjustable for 8 different directions of discharge.



MILCOR will again give you the finest sheet metal products

Milcor Steel Company

MILCOR

Milwaukee 4, Wisconsin

AN OPEN LETTER TO OUR FRIENDS

When the most cruel and devastating war in all history struck almost without warning in December of 1941, our Government called on all industry for support.

We at Milcor recognized our duty to our country — we accepted our obligation to help in preserving the American way of life in which our dealer-friends were such vital factors.

Along with the thousands of other manufacturers alert to the necessity for immediate action, we were proud to help build vitally needed implements of war.

We did not do this without making what, to us, was a considerable business sacrifice. But we felt our responsibilities keenly — and we knew that every one of our loyal American dealers would back us up 100% in our effort to help save our country and the men who are risking their lives in the fight for it. After the war we can look those fighting men in the eye and tell them we did our part.

Although war materials have comprised by far the greater part of our production during these war years, Milcor peacetime machinery is still intact, so there need be no delay for "reconversion" when Victory is won and sufficient raw materials are released.

Already, we have resumed manufacturing — in extremely limited quantities — the widely-accepted Milcor sheet metal products which have earned for you and for us an enviable reputation. We look forward to the day when this production can be greatly increased.

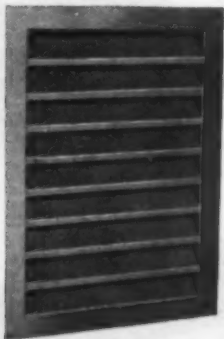
In the future, as in the past, you can count on Milcor as a dependable source of supply. You can count on better service from more distribution centers and an improved line of standard sheet metal products, plus interesting new developments that promise to win and hold new customers for you.

Yours for greater success,

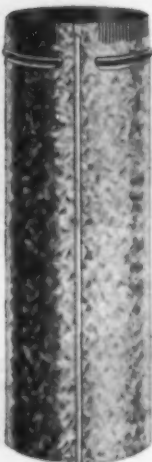
E. T. Tinner

President
Milcor Steel Company

MILCOR
Rain-carrying
Equipment



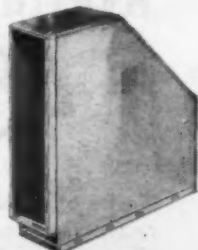
MILCOR
Louver Ventilators



MILCOR
Furnace Pipe
and Fittings



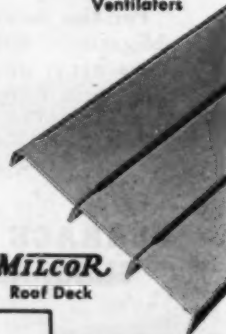
MILCOR
Tin Pipe
and Fittings



MILCOR
Single Wall Stack
and Fittings



MILCOR
Ventilators



MILCOR
Roof Deck

MILCOR STEEL COMPANY

MILWAUKEE 4, WISCONSIN

CANTON 1, OHIO

Chicago 9, Illinois • Kansas City 8, Missouri • Rochester 9, New York

Los Angeles 44, California • Baltimore 24, Maryland

Now able to serve you better through acquisition of

THE J. M. & L. A.
OSBORN Co.
CLEVELAND 14, OHIO
DETROIT 2 • BUFFALO 11 • CINCINNATI 25
as a **MILCOR** subsidiary



This is Just One RYBOLT customer

He stands out from the crowd and he's smiling because he knows he has been fairly and equitably treated in RYBOLT'S wartime distribution of warm air furnaces.

He knows too from his own experience that RYBOLT'S will continue to be his best source of supply when peace comes and he can share in the increased output of established popular products as well as the new products RYBOLT engineers are now developing.

He knows all of these things even though there may have been occasions when he didn't receive quite all of the furnaces he would have liked.

Peacetime production is still a long ways off. Manpower is just as scarce as ever. Material is still hard to get and according to Washington advices this situation will be just as bad six months from now. Many manufacturers are still tied up—in whole or in part—with war contracts which prevent resuming production of civilian products. The stock rooms of the furnace in-

dustry are almost as bare as Mother Hubbard's cupboard.

Of course, the smiling gentleman above is *only one* of many loyal RYBOLT customers who have stuck with us for years—some of them ever since we started business. They have been patient and co-operative during trying times and we appreciate their loyalty to us even more than they appreciate what we have done for them.

And we hope many other dealers and distributors will join the RYBOLT parade when peacetime production is resumed on an increased scale. Then, more RYBOLT warm air furnaces and air conditioning units, for use with coal, gas or oil, will become available—in new, better postwar models as well as some of the old popular stand-bys (with improvements, of course).

So, if you are not already selling RYBOLT products, plan now to join the happy gent pictured above as soon as conditions make it possible.

*Buy an Extra
War Bond!*



THE RYBOLT HEATER COMPANY
615 MILLER STREET ★ ASHLAND, OHIO

Palmer MANUFACTURING CORP. of Phoenix

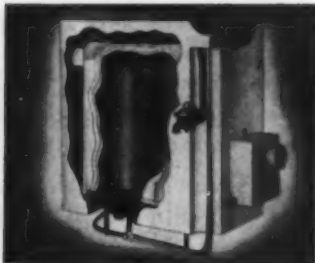
A NAME TO REMEMBER IN AIR-CONDITIONING



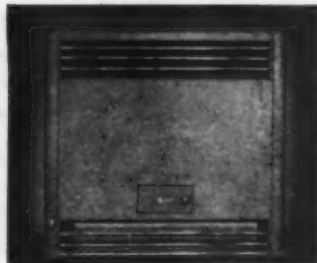
SNO-BREZE
EVAPORATIVE COOLERS

Here is the principle of cooling through evaporation, perfected in the Sno-Breze cooler! It is the result of over 30 years of development in the proving-ground of air-conditioning equipment, the Arizona desert. If it is effective here, it has to be good! Illustrated is the horizontal model. Also in upblast, downblast, and all size fan models. Consult local WPB for priority.

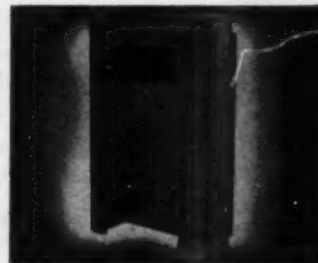
PALMER GAS FURNACES SOLVE ALL HEATING PROBLEMS



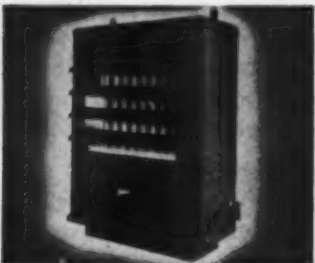
FLOOR FURNACE. Double insulation means cooler grill temperatures. AVAILABLE WITHOUT PRIORITY. 25,000 to 70,000 BTU.



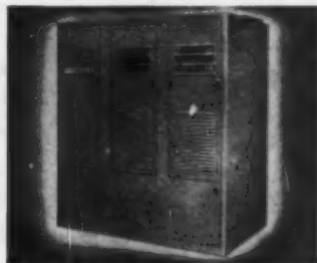
SPACE HEATER that typifies perfection of Palmer products, 35,000 BTU size. Consult local WPB ofc. for priority.



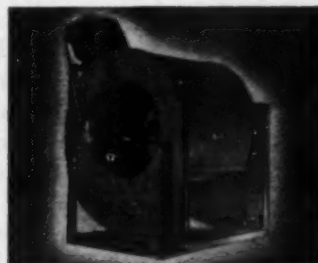
UNIQUE WALL FURNACE. Solves small home needs. Single or dual outlet. 20,000 to 35,000 BTU. Consult WPB for priority.



SUSPENDED UNIT HEATER. Efficient heating for stores, factories. 55,000 to 200,000 BTU. Consult WPB for priority.



FORCED AIR central heating furnace, big size shown. Modern, compact. 50,000 to 600,000 BTU. Consult WPB for priority.



QUIET-ZONE BLOWER. Noiseless, efficient. Sturdy construction. In sizes from 500 to 30,000 CFM. Consult WPB for priority.



THE PALMER PENGUIN SAYS: "GET SET FOR SALES! STOCK PALMER PRODUCTS! WRITE FOR FREE LITERATURE AND PRICES. PALMER MFG. CORP., PHOENIX, ARIZONA."

Leadership



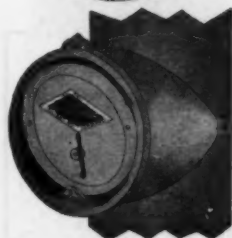
**WALKER FUEL SAVER
TYPE 34-B AND 34-C
WITH STOVE PIPE
TEE JOINT**

More than 4,500,000 units of these famous WALKER Regulators have been installed for the fuel users of America. Furnished in sizes 3" to 10" inclusive, in blue, chrome or cadmium, if and when available, and packed in individual cartons or bulk.



**COMMERCIAL AND
INDUSTRIAL FUEL SAVER
DRAFT REGULATOR**

Walker makes a full line of industrial controls. Sizes 16" to 36" inclusive, made of heavy cast ring with deep-drawn flanged steel plate with adjustable ball-bearing construction. For use with the heaviest drafts and any kind of fuel.



**WALKER FUEL SAVER,
TYPE NO. 34**

maintains proper draft regulations under all conditions for furnace, boiler, stove or hot water heater. Domestic sizes 4" to 20" inclusive, furnished with or without collar, in either Galvanized metal or Cadmium Plated finish, if and when available.

Year after year WALKER has paced the industry in improvement of methods and facilities, in uniformity and utility of product.

That's why Today WALKER is the World's largest exclusive manufacturer of Automatic Draft Controls.

WE MUST SAVE FUEL

That's why the National Fuel Conservation Program makes reconversion an actuality for the heating industry TODAY.

WALKER AUTOMATIC DRAFT REGULATORS save up to 50% of the Fuel consumed through improper hand controlled dampers.

Do your part for the war effort by selling and installing Walker Automatic Draft Regulators—there's a handsome profit for you, Mr. Heating Unit Manufacturer, and your Dealer Agent—Economy and Satisfaction for your Customers.

REMEMBER

**WE DO NOT COMPETE EITHER DIRECTLY OR INDIRECTLY
WITH ANY MANUFACTURER OF ANY KIND OF HEATING UNIT**

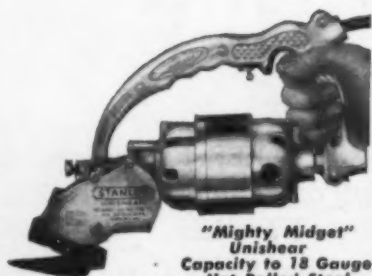
This mammoth plant which is two stories and contains more than 110,000 sq. ft. of floor space is indeed a fitting monument to Walker aggressiveness. With a capacity of over 1,000,000 units yearly, you are assured of not only the finest quality and most efficient draft regulators available, but excellent service as well.



ALL WALKER PRODUCTS
ARE LISTED AS STAND-
ARD BY THE UNDER-
WRITERS' LABORATORIES.

WALKER MANUFACTURING AND SALES CORP.
1712-16 PENN. ST. ST. JOSEPH, MO.

UNISHEARS



"Mighty Midget"
Unishear
Capacity to 18 Gauge
Hot Rolled Steel



Unishear No. 16A
Capacity to 16 Gauge
Hot Rolled Steel



Unishear No. 214
Capacity to 14 Gauge
Hot Rolled Steel



Unishear No. 144A
Capacity to 12 Gauge
Hot Rolled Steel



Unishear No. 208
Capacity to 8 Gauge
Hot Rolled Steel



Five portable models to choose from

Speed and more speed — that's the order of the day in sheet metal work. Unishears will put this speed into your production — and do it with precision, too!

Stanley Unishears are compact and powerful tools that zip through hot or cold rolled steel or galvanized iron at 15 to 20 feet a minute as fed. Follow straight lines, curves, angles and cut notches with hairline accuracy. Can be used for inside cuts by simply cutting an entry hole inside the sheet.

Other Stanley portable models are available in five sizes as shown. Stationary models handle metal up to 10 gauge. Write for full information. Stanley Electric Tools, Division of The Stanley Works, 131 Elm St., New Britain, Conn.



STANLEY

TRADE MARK

STANLEY UNISHEARS

Electrically Driven Metal Shears



COMPACTNESS

means more for the customer's dollar

REMEMBER when furnace values were measured by the size of the unit? Today, modern research and engineering have completely changed that concept . . . have shown how the application of new materials, and new design can make for greater compactness and *higher heating efficiency* in smaller units.

For instance — Janitrol's *Multi-Thermex tubes*, combined with Amplifire ribbon-type burners.

With these two unique Janitrol developments, bulky combustion chambers are eliminated. Short, hot, uniform flames are burned

directly within the heat exchanger tubes. Heat is more quickly transferred to the circulating air chamber.

Results?

First, overall smaller size saves materials, permitting the use of more expensive alloys in certain critical parts for more rapid transfer of heat.

Secondly, the design and construction of Multi-Thermex tubes means quicker response to thermostatic control. Less lag when heat is needed. Quicker cooling to prevent costly and uncomfortable overheating.

Third, smaller size of Janitrol makes possible factory assembling of heater, quicker, easier, less costly installation, and more usable space in the basement or utility room.

So, when you install a Janitrol FAC Winter Air Conditioner, you're installing *less* furnace by weight and volume—but *more heating economy* and *long lasting liveability* than is possible with conventional forced air furnaces. Write today for information and data on the complete line of Janitrol Gas-Fired Heating Equipment. Surface Combustion, Toledo 1, Ohio.

Janitrol

**GAS-FIRED
HEATING EQUIPMENT**



[illegible]

... featuring • Rapid Air Circulation • Quiet Operation • Uniform Heat Distribution. It is capable of circulating the air in an average five room house four times per hour.

One large gas port eliminates burner stoppage. Large full length, combustion chamber does *not* get red hot. Light air hood is easily removed for cleaning. Easily installed and reasonably priced. Available in four sizes—input ratings are 25,000 B. T. U., 35,000 B. T. U., 50,000 B. T. U. and 68,000 B. T. U.

John Zink manufactures Gas Burners, Oil Burners and Combination Burners for: Domestic, Industrial and Commercial Boilers—Burners for natural, artificial or Butane gas.

Special burners designed and manufactured for special purposes.

TWO OUTSTANDING ALL-STEEL HOME HEATING UNITS



The COUNTERFLOW AIR CONITIONING HEATING SYSTEM

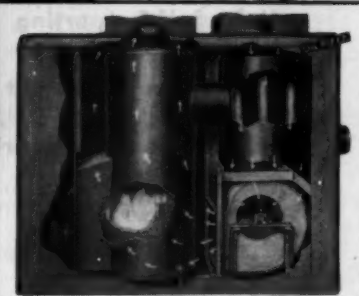
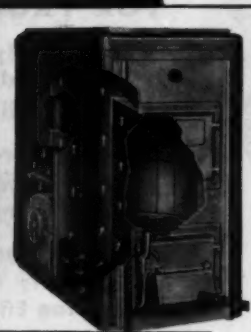
Within the attractive enameled casing of these heaters is combined all the elements of modern home comfort. The Counterflow Steel Furnace with rectangular steel casing and with heat saver, blower, motors and filters, all combined into one unit, has been designed for the home owner who desires better and more compact equipment than offered by the standard type of furnace with auxiliary blower.

Here is a double body furnace, in one casing, providing longer fire travel and greater heat absorption surface for less heating cost. The outstanding features of all types of modern home heaters are accumulated into one compact unit which produces healthier and cleaner warm air circulation.



WARMS
FILTERS
HUMIDIFIES
CIRCULATES

Information on large size
furnaces ranging from
500,000 to 4,000,000 BTU's
is available upon request.



WRITE FOR BULLETIN NO. 293C

CERTIFIED GRAVITY R-G FURNACE



The steel body of the furnace is electric arc welded with front welded on to the body to save installation costs. High combustion chamber permits proper combustion of all fuels. Heavy boiler type grates provide efficient and economical use of coal, coke or wood. Radiator is baffled on the inside so that all possible heat is absorbed from the gases before leaving the furnace. Built in sizes 22" to 36" in diameter with leader pipe area of 527 to 1,351 square inches.

GAS TIGHT
•
SMOKE PROOF
•
EXTRA LARGE FEED AND
ASH REMOVAL DOORS
•
STRONG, STURDY
ROCKER TYPE GRATES
•
HEAVY BOILER
PLATE STEEL
•
ELECTRIC ARC WELDED

CERTIFIED HEATING DIVISION OF

STAINLESS & STEEL PRODUCTS CO.

1000 BERRY AVENUE

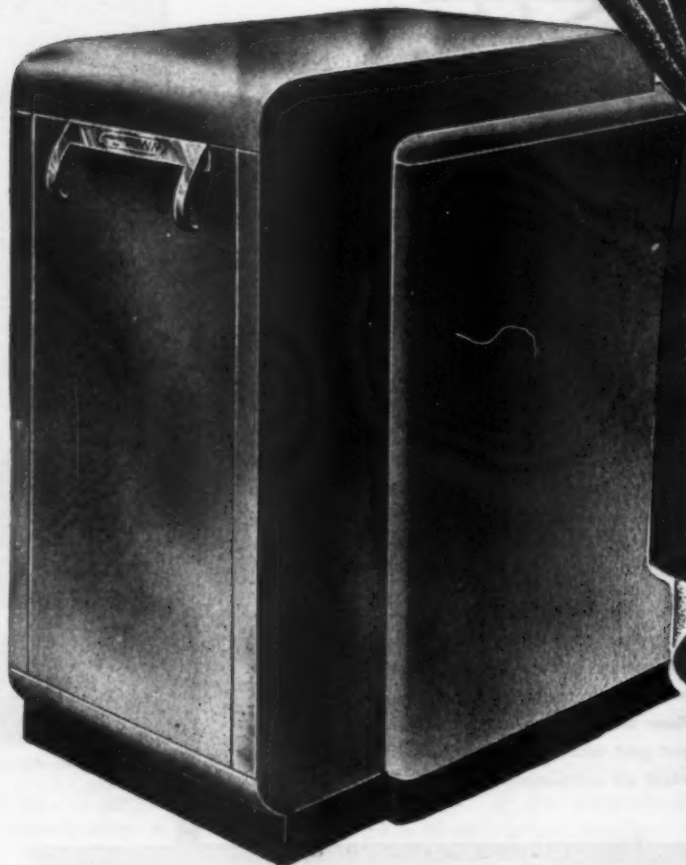
ST. PAUL 4, MINNESOTA

THIS IS THE NEW PENN PACKAGED BOILER-BURNER UNIT

NOW RELEASED FOR PRODUCTION

- Completely Factory Pre-fabricated
- *Gas or Oil Fired Boiler Burner
- New, Improved Fire Travel for Better Heat Transfer . . . Low Stack Temperature
- New Penn "Volatol" Feed Preheats Oil for Peak Combustion Efficiency
- Unit Self-Supporting . . . Needs No Foundation
- Installation Labor Cut Up to 90%
No Basement Engineering Guesswork

* A.G.A. Approved



Penn Packaged Boiler-Burner Units, refined, improved and completely packaged, will soon be coming off the assembly lines.

Spot re-conversion permits us to make a limited number during the early months of 1945. "Wrapped up" in a modern jacket, these new heating packages will put Penn Dealers far ahead in the field of sales.

Check the outstanding performance features listed above. Soon we'll show you exactly what's inside to

back up our statements. (A cut-away detail illustration of this and other Penn Units will appear in an early advertisement.)

Dealers who are still looking for modern heating equipment . . . units that will be salable as only a complete package can be . . . are invited to write or call us today. You'll find Penn an aggressive and cooperative manufacturer, thoroughly equipped to fill the demands for finer domestic heating.

*Packaged
by* **PENN**

PENN BOILER and BURNER MANUFACTURING CO., INC.

LANCASTER, PENNSYLVANIA

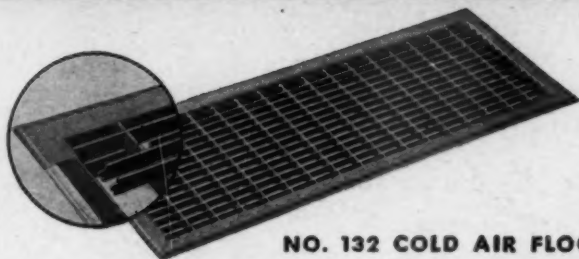
INDEPENDENT

"Fabrikated"

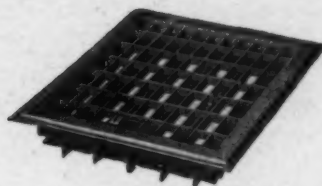
REG. U. S. PAT. OFFICE

FLOOR FACES AND REGISTERS

★ Independent "Fabrikated" construction is applied also to air conditioning registers and grilles. Each grille bar may be individually adjusted to direct the airflow as desired. Further details given in catalog 41AC.



NO. 132 COLD AIR FLOOR FACE



NO. 32 FLOOR REGISTER

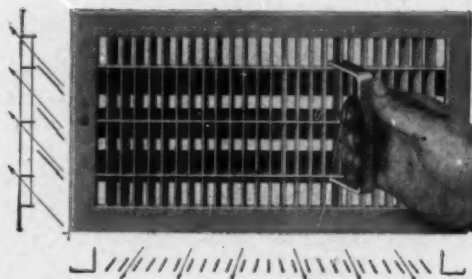
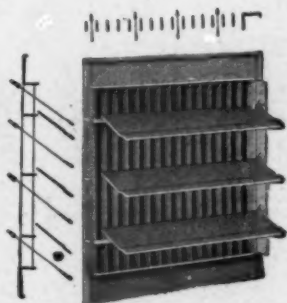
INDEPENDENT "Fabrikated" WALL GRILLES WITH DEFLECTING VANES

Style 321A Grille with Deflecting Vanes

★ With vertical grille bars and horizontal deflecting vanes. The grille bars may be individually adjusted to direct air flows to right or left; and the vanes are made individually adjustable to deflect air flows up or down.



REAR VIEW
SHOWING
ADJUSTABLE
DEFLECTING
VANES



ALWAYS LEADING — ALWAYS PROGRESSING

THE INDEPENDENT REGISTER CO.

3747 EAST 93RD STREET, CLEVELAND, OHIO

PULL UP A CHAIR

A S

PO



A SIXTY SECOND MESSAGE ABOUT STOKER SALES

● Pull up a chair . . . it will take you sixty seconds and a penny postcard to get all the facts about a dealership for the famous "Original Pocahontas" bin-feed, ash removal bituminous stoker, the stoker that has eliminated back-breaking hopper filling—disagreeable clinker-digging—and gives the only completely automatic coal heat that competes with oil or gas. Manufactured for over ten years—thousands in use. Investigate the completely automatic stoker of tomorrow . . . already manufactured today.

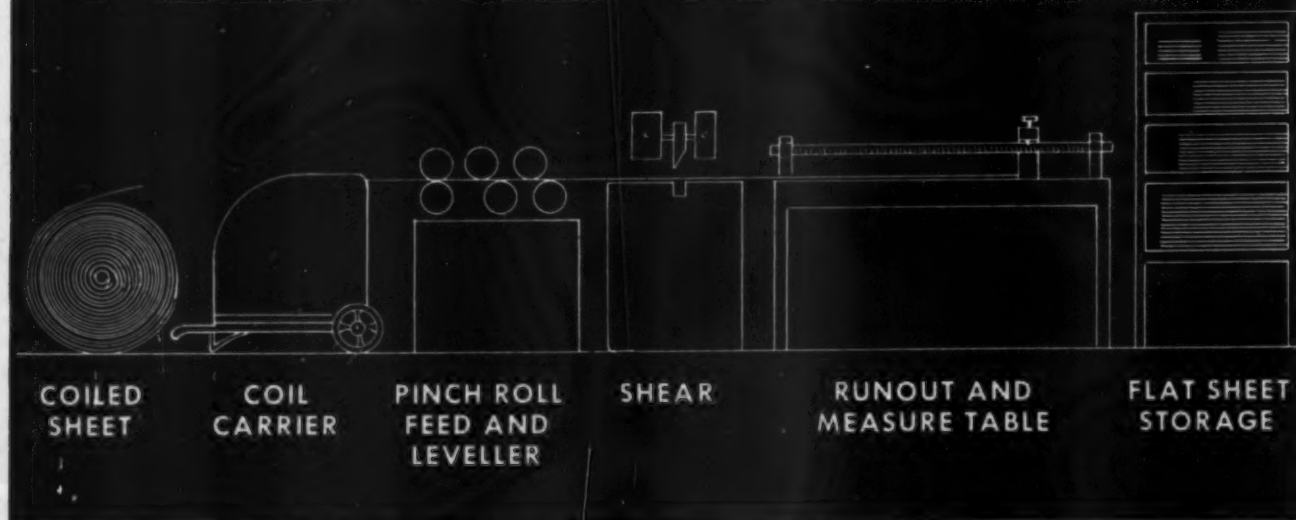
POCAHONTAS FUEL COMPANY INCORPORATED

Stoker Division: 330 EAST 131st STREET • CLEVELAND 8, OHIO

POCAHONTAS

THE FIRST SUCCESSFUL BITUMINOUS
BIN-FEED, ASH REMOVAL STOKER

PLAN FOR EVOLUTION



In Sheet Metal Shop Economy

If

you will send us a sketch of the floor plan of your shop with location, size and type of present installation indicated, our engineers will prepare a simple design showing you how the Yoder Coiled Sheet Line should be fitted into an efficient, modern, time and cost saving layout . . . Address attention of Sheet Metal Engineer.

MODERN sheet metal shops find one answer to the problem of reducing costs by cutting their own lengths from coiled sheet, simplifying stock storage, eliminating waste and cutting corners on many odd-size fabrication headaches.

After years of living with the old method of buying flat sheets, some old timers at first said . . . "Sounds like a revolutionary change" . . . They are learning that it is rather a matter of evolution. Mills have developed such vast facilities and improved methods for producing high quality cold-rolled and coated sheet in coils that the reasons for jobbers, contractors and large shops handling their stocks in that form are now obvious . . . high quality sheet . . . fine coatings . . . unheard of low initial cost . . . substantial savings in use.

The Yoder Company has bridged one big gap between the old and the modern method by developing special equipment for simple, efficient coiled-sheet handling. A complete layout includes a coil carrier, pinch-roll feed and leveller, shear and a run-out and measure table.

It is so designed that if you have satisfactory shear equipment now, the rest of the Yoder units can be adapted to what you have. The equipment will be priced within the reach of contractors, jobbers and large shops.

The complete story is too much to tell here, but it is "hot as a pistol" and it offers you an entirely new way to cut costs.

Write now for more details, to . . .

THE YODER COMPANY

5522 Walworth Ave. • Cleveland 2, Ohio



THE ORDER OF THE DAY



When Work Like This Is Over For
Our Men Who Used To Make

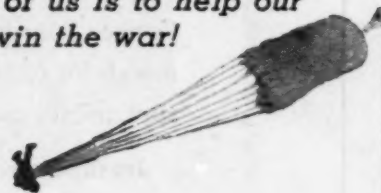
HANDY PIPE

And The Materials Are Again Avail-
able In Quantity,

*The Handy Pipe And Duct Work
You Know So Well Will Again
Be THE ORDER OF THE DAY.*

But until then, we can only fill what
orders our available manpower and
materials permit.

Meanwhile, *the most important
job for ALL of us is to help our
FIGHTERS win the war!*



Just How Much Would YOU Put
Into Bonds To KEEP, Rather Than
Take The Place Of A Man Who Is
FIGHTING To Bring Peace And
Normal Business Back For You?

F. *Meyer* & BRO. CO.
PEORIA, ILLINOIS



All Photos are Official



When restrictions are removed, fabricators of gutters, leaders and accessories will once again supply these products made of Anaconda Copper.

Durability... Workability... Beauty

COPPER HAS ALL THREE

Copper continues to be first among metals for resistance to outdoor exposure and for ease of forming.

Its superiority as a corrosion resistant, non-rusting material has long been established in flashing, sheathing, roofing, rain disposal systems,

and for various types of outdoor decorative applications.

The workability of copper, together with the rich green patina acquired on exposure in most localities, make it especially desirable for cornices, domes and ornamental panels.

4404

BUY WAR BONDS . . . Keep buying them, Buy them for Keeps

Anaconda Copper & Copper Alloys



THE AMERICAN BRASS COMPANY— General Offices: Waterbury 88, Connecticut
Subsidiary of Anaconda Copper Mining Company
 In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont.

Increase Your Roof Ventilating Business in 1945
with Swartwout

AIRMOVER



*Large or Small Volume
Single or Multiple Units*

For all

Industrial or Commercial Buildings

● The most up-to-date method of roof ventilation—Swartwout AIRMOVER—gives you a wide range of contract possibilities. On large buildings or small, this highly efficient, easily installed system meets your customers' demands for economical, modern, good looking equipment (only 32" high) for new buildings or for the vast number of alterations that are being planned. You can handle a large volume of this business—supply a much-needed service to your industrial and commercial building owner customers. Ask us for information about the Swartwout AIRMOVER.

Other roof ventilators in the popular Swartwout line of airmovers help you handle any roof ventilation requirement. We'll help you plan installations on which you need technical advice. Write for full particulars.

The Swartwout Company • Airmover Division
18511 Euclid Avenue • Cleveland 12, Ohio

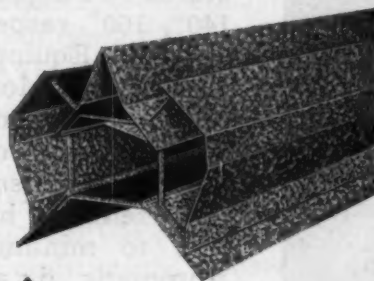


Swartwout
AIRJECTOR
efficient powered rotary

Installation on prominent
steel mill. Each unit equals
a 6 ft. round ventilator

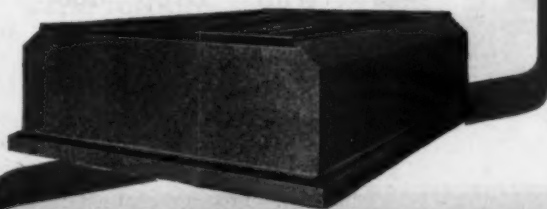


Swartwout ROTARY
standard for 40 years



Swartwout-Dexter
Heat Valve—original
continuous ventilator

Swartwout
AIRMOVER
for large scale air
movement



VENTILATION SPECIALISTS
Swartwout



AUTOMATIC OIL BURNING FURNACES

MONOGRAM AUTOMATIC OIL BURNING HOT WATER HEATER

Here's plenty of hot water all the time! The extra large galvanized storage tank plus extra fast recovery rates are your assurance of that! It's

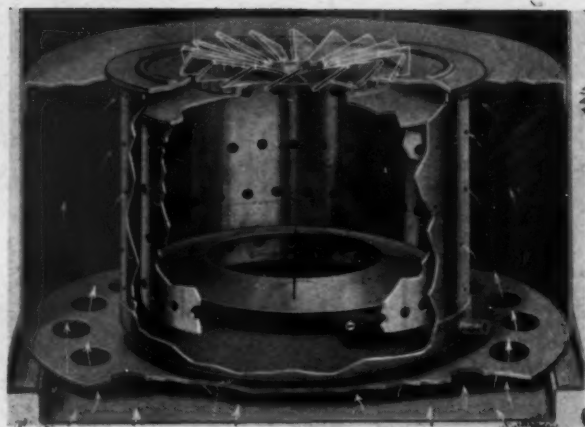
100% automatic. Aquastat control has three settings, Warm, Medium, Hot; water temperatures are 110°, 140°, 160° respectively. Equipped with a 5-inch Monogram Vaporizing Oil Burner. Complete boiler insulation reduces heat loss to minimum. Automatic draft regulator. Outer cabinet in green, ripple and black trim. Drop door gives easy access to burner parts. Outside thermometer.



MONOGRAM WINTER AIR CONDITIONER

Here's a rare combination of attractiveness and high efficiency! In three models: No. 125, 90,000 B.t.u.; Model No. 150, 120,000 B.t.u.; Model No. 250, 150,000 B.t.u. Easy access to inner chambers through panels, front and rear. Double baffle in heating drum; Automatic Oil-Air Control set; automatic humidifier; combination limit control and blower switch and automatic draft regulator is standard equipment.

The **QUINCY STOVE MFG. CO.**
QUINCY, ILLINOIS



Emphasis on Healthful Comfort Wherever MONOGRAM VAPORIZING BURNERS are Used!

IN Alaska at 40° below or in the less severe zones Monogram Turbulent Flame Vaporizing Burners *do the job of maintaining healthful comfort* because . .

Monogram's exclusive engineering achievement which converts oil to gas and mixes the gas with air before combustion

. . . produces a flame that is hot-

ter, cleaner, more efficient under all conditions. It is a gas flame made from economical oil with all the highburning qualities of gas.

If your file of information on Monogram Oil Burners, Winter Air Conditioners, Booster Gravity Units, Room Heaters, Hot Air Heaters and other Monogram products is not complete, write for information today.

*Be sure you have a straight line on Monogram . . .
the straight line to profit and customer satisfaction!*

The **QUINCY STOVE MFG. CO.**
QUINCY, ILLINOIS

THIS AIRPLANE MANUFACTURER
SPEEDS PRODUCTION
 WITH THE HELP OF
SKILSAW!

All action photos from
 CURTISS-WRIGHT CORPORATION
 AIRPLANE DIVISION—ST. LOUIS PLANT

In this special jig... SKILSAW speeds
 the cutting of aluminum for fuel tanks

This demonstration of SKILSAW's extra speed, power and versatility is one more example of how SKILSAW helps manufacturers boost war production. A big job gets done hours faster when a leading aircraft maker puts SKILSAW to work on an important part of the operation. So it goes in busy plants everywhere... SKILSAW does a better cutting job faster and easier... in a jig or freehand... on a variety of materials.

SKILSAW is a marvel of compactness, light weight and handling ease. It goes right to the job, saves material handling, saves time, saves manpower and money.

No matter how difficult your problems may be in cutting many materials, see if your distributor can't show you a better answer with SKILSAW. Phone him today for a demonstration.

SKILSAW, INC.

5033-43 Elston Avenue, Chicago 30, Ill.

Sales and Service Branches in All Principal Cities

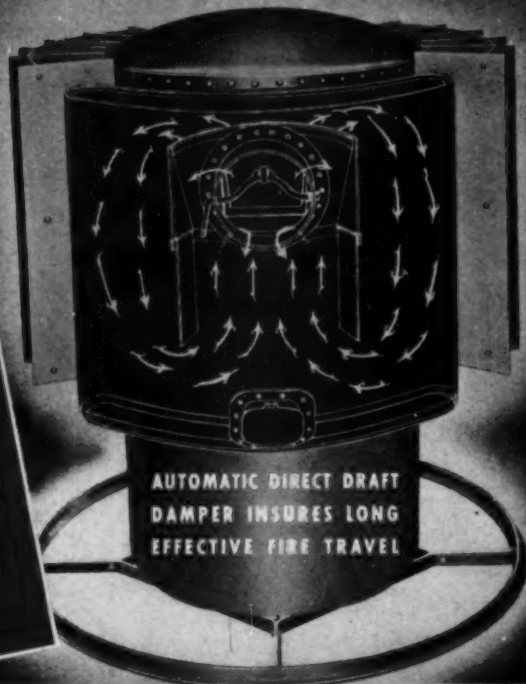


SKILSAW PORTABLE ELECTRIC **TOOLS**
 MAKE AMERICA'S HANDS MORE PRODUCTIVE

Write Now!
FOR A **VICTOR**
DEALERSHIP

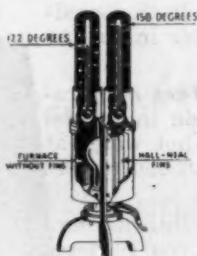
SELL THE
FURNACE WITH THE FINS

Get the VICTOR line . . . famous for
quality since 1890. WRITE NOW . . .
for our dealer proposition. It will
make you money in 1945.



FURNACES—OIL BURNERS—GAS BURNERS—BLOWERS—STOKERS—ACCESSORIES

This Helps You
SELL



**The Hall-Neal
Table Top Demonstrator**

This miniature furnace, with FINS on one side and none on the other, dramatically proves to your prospect the increased heat radiation delivered by the side with FINS. It sells them right on their desk or table.

**With This Complete Line You Can
Handle ANY JOB — MAKE MORE MONEY**

In beauty . . . in advanced engineering design . . . in efficiency . . . in sturdiness . . . in ease and economy of installation . . . the VICTOR line leads the field. You'll make more money selling VICTORS—with FINS—because you'll have less sales expense . . . make sales easier. We give you something that SELLS. The VICTOR line has EVERYTHING that all other high quality furnaces have *PLUS the exclusive Hall-Neal FINS.*

Write us for full particulars. Tell us about yourself—your organization and qualifications. Affiliate with HALL-NEAL . . . get set now to make more money in 1945.

ENGINEERING ASSISTANCE HELPS YOU SELL!

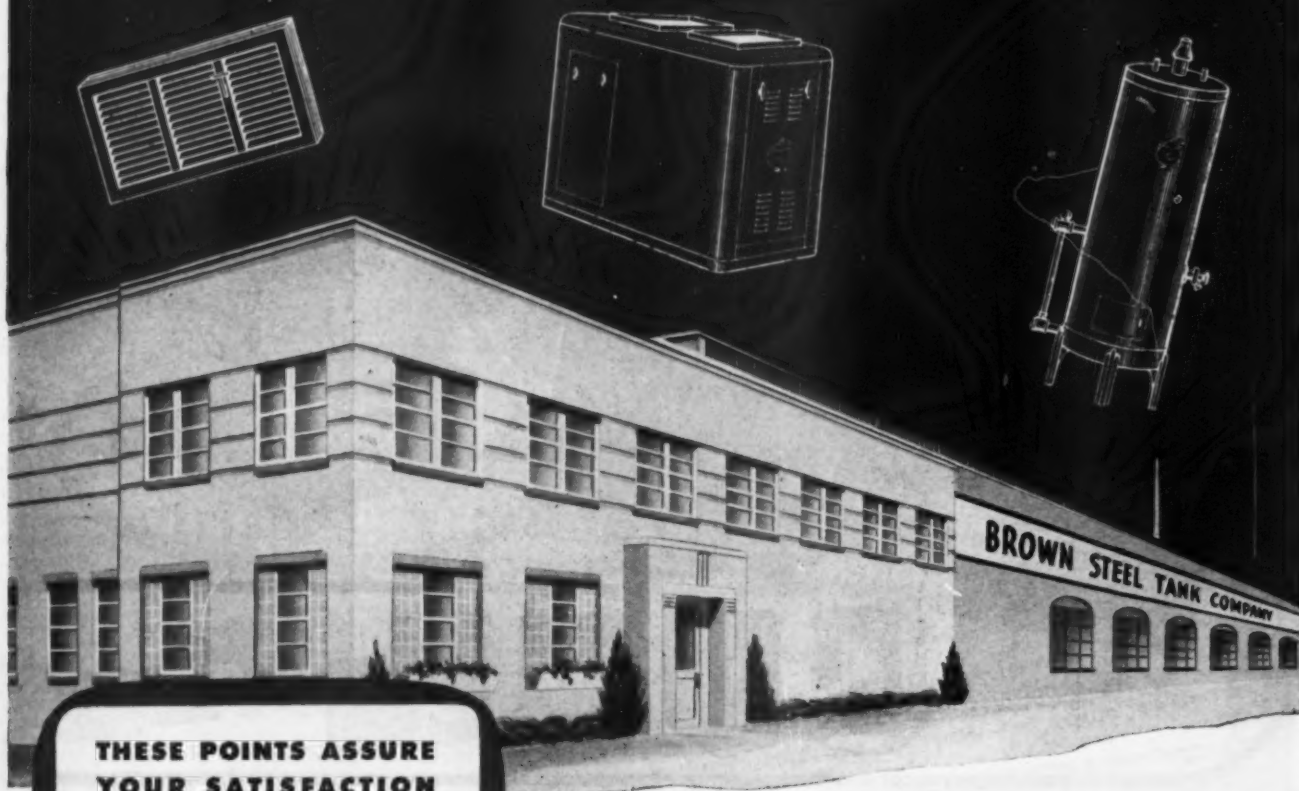
An experienced, practical down-to-earth staff of six heating engineers, headed by Guy A. Voorhees, is at your service at all times to give you speedy, sure-fire engineering service. This service helps you sell more units per month—makes you more money per year.

HALL-NEAL FURNACE Co.

VICTOR Quality Furnaces Since 1890

1326 N. CAPITOL AVENUE • INDIANAPOLIS 7, INDIANA

Preview



**THESE POINTS ASSURE
YOUR SATISFACTION**

Brownie's postwar products are not "war babies."

Each is carefully planned and developed by competent engineers who know that the Brownie emblem must *always* symbolize dependable construction and use of correct materials.

Experienced Designing is an essential factor. This assures you of latest technical improvements to provide superior performance.

Careful Craftsmanship in Brownie's huge modern plant—equipped with new presses, tools and welding equipment—gives added efficiency in construction and reduces cost of finished products.

Competent Testing by approved methods makes certain that Brownie-built equipment will give you *more* years of dependable service.

Efficiently designed for modern homes are a number of new Brownie-built products which you'll want to specify on your plumbing and heating plans tomorrow. Here's a preview:

Residential Heating Units, using a new principle of fuel combustion, will be offered in a new, complete line of Brownie-built furnaces. Both forced-air and gravity types will be available in gas- or oil-fired models.

Automatic Gas-Fired Water Heaters of ultra-modern Brownie design will be made in several sizes. Their ability to provide *more* hot water at *less* cost will make them popular with contractors and home-owners alike.

Other New Products to bear the Brownie emblem will include air registers, grilles, coal furnaces and other equipment *in addition to our former peacetime products.*

Write for details today!

WE'RE LOOKING For Aggressive Postwar Dealers! If interested, ask for further information about Brownie's postwar sales program.



BROWN STEEL TANK COMPANY

NOT AFFILIATED • ONE OFFICE, ONE PLANT • MINNEAPOLIS, MINNESOTA

chicago

STEEL PRESS BRAKES

SPEEDY, precise, efficient production that will assure more ships, planes, tanks, guns and their accessories is what we all are striving for on today's War Production Front.

Yes, this ever-increasing production means many shops and plants must make equipment additions to keep the ball rolling . . . and that's where CHICAGO Steel Press Brakes do their part to perfection.

Ruggedly constructed to assure long-life and trouble-free service, they do their given tasks, quicker, better and more efficiently. Made in sizes to handle steel sheets from 4 to 20 feet in width, and incorporating many exclusive features in design and operation, they will fit into your shop, solve your particular production problem . . . and reduce operating costs.

Save Time . . . the most important factor in the war effort with D & K CHICAGO Steel Press Brakes . . . prompt deliveries can be made for all war requirements. Full information and catalogue will be sent upon request.



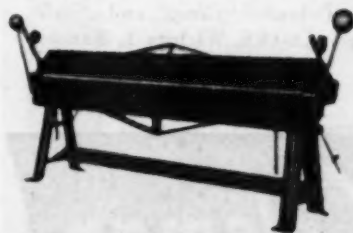
CHICAGO—Series D Steel Press Brake has exclusive non-deflecting bed, automatic friction brake, and automatic oiling systems. Sizes 4 to 20 ft. capacities up to 5½" plate.

Standard and Heavy Duty Series . . . handles sheets from 37" to 72", cushioned-type clutch, zerk-olemite lubricating systems, quick adjustment features, variable speed drive, compact, sturdy constructions.



Also Remember

CHICAGO Hand Bending Brakes of all Types



Standard hand brake, one-man operation.



Portable hand brake. Light weight, maximum strength, powerful clamping.



Box and Pan Brake. Adjustable and removable fingers permit any size box or pan to be formed.



Adjustable Double Brake for forming two bends at one setting.

DREIS & KRUMP MANUFACTURING CO.

7404 LOOMIS BOULEVARD • CHICAGO, ILLINOIS

A. E. Byrnes

Byrnes Plumbing & Heating Co.
Memphis, Tenn.



Says This About His Experience As A Coleman Dealer:

"Telling Customers It's A Coleman Floor Furnace Is All The Selling Necessary"

"I tried three different makes of floor furnaces before taking on the Coleman line. I had so much trouble, I decided to quit the floor furnace business and let the other fellow have all the headaches. I finally decided to try out the Coleman Floor Furnace. From the beginning, the Coleman came up to all expectations in performance. It is streamlined, precision-built, thoroughly tested at the factory, and if properly installed, servicing on Coleman Floor Furnaces is practically

eliminated. When you tell the prospective buyer that you are handling the Coleman Floor Furnace, in most cases, that is all the selling necessary. After all, the best is the cheapest in the long run. I am a satisfied Coleman dealer, and I have thousands of satisfied customers."

Coleman franchise dealers are being appointed now by America's leading distributors for post-war sales of these Coleman Heating Appliance lines: Oil Heaters; GAS, OIL and LP-gas Floor

Furnaces, Water Heaters, and Central Heat Plants. This franchise is awarded to aggressive dealers who can qualify and handle the volume of Coleman business they can easily develop. Write us for the name of your Coleman distributor, who can tell you the complete story of the Coleman opportunity in the waiting billion-dollar home-heating market. Coleman Lamp and Stove Co., Dept. AA-10X, Wichita 1, Kansas.



THE "HOT" NAME IN HOME HEATING




THE COLEMAN LAMP AND STOVE COMPANY • WICHITA 1 • CHICAGO 11 • PHILADELPHIA 8 • LOS ANGELES 54 • TORONTO, CANADA




HUSSEY

COPPER PRODUCTS



PRECISION-PROTECTED ..



THROUGH MODERN
PRODUCTION METHODS
for constant uniformity
of GAUGE and TEMPER

"PRECISION-PROTECTED" Hussey Copper Products offer peacetime designers and users of copper, in every industry—a new, higher standard of economy, uniformity and quality. Throughout every step of production,

master craftsmen and modern testing equipment are constantly checking and rechecking to provide complete uniformity and deliver a copper product to meet your most exacting specifications. Let Hussey co-operate with you.

YOUR DEPENDABLE
SOURCE
FOR QUALITY COPPER
AND BRASS PRODUCTS

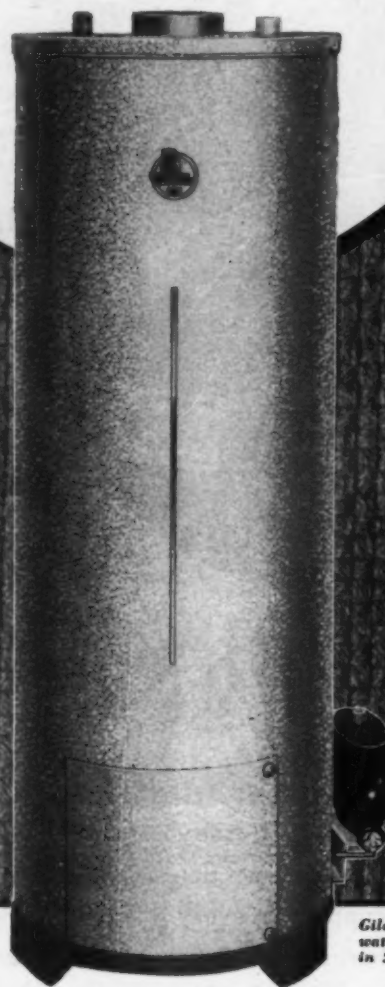
C. G. HUSSEY & COMPANY

DIVISION OF BRASS & COPPER CO.

Rolling Mills and General Offices, PITTSBURGH, PA.

Manufacturers of Precision Castings

GILCO
THE WATER
HEATER THAT SETS
A NEW STANDARD



*Gilco automatic oil burning
water heaters are available
in 20, 30, 40, 50 gal. sizes.*

GILCO oil burning automatic water heaters have set a new standard in performance, design and appearance. They literally pay for themselves in savings in cost of operation. Thousands of users will verify that statement. While the Army, Navy and other Government Agencies still take the bulk of our production, there are a limited number available for civilian use. Gilco products, after Victory, will include a complete line of oil and electric water heaters and oil and gas fired furnaces.

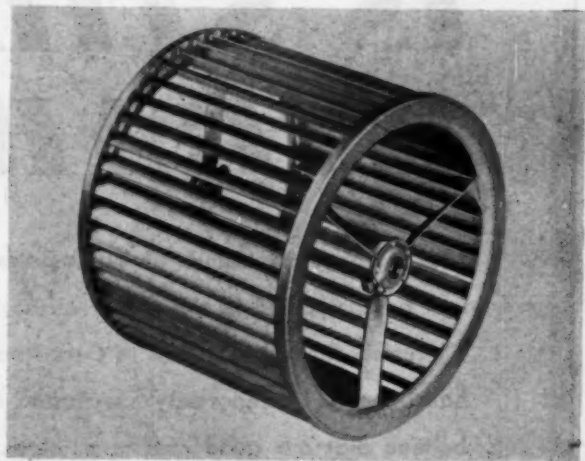
J. L. GILLEN COMPANY • DOWAGIAC, MICH.

"TIE UP NOW WITH THE LEADER"

Airstream



Catalogue will be ready for mailing approximately Feb. 1, 1945. Contains complete list of sizes and capacities of Morrison Airstream Blower Wheels.



PATENTED

The new 1945 Morrison Airstream Catalogue is a practical manual that shows you how to make your own blower assemblies by the highly successful Morrison method. Illustrations and descriptive matter are complete, simple, time-saving. You should be sure now that you receive

the Morrison Catalogue as soon as it is off the press!

You will receive a copy of the 1945 Morrison Airstream Catalogue if your name is on our mailing lists, but if you have had no previous correspondence with us, write us at once and we will mail your copy promptly. If your address has been changed recently or if we do not have your postal zone number, be sure to send it to us immediately.

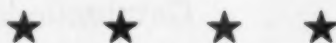
Have all of the facts about Airstream Blower Wheels, one of the greatest forward strides in aerodynamic design. The catalogue contains complete engineering data.

MORRISON PRODUCTS, INC.

16816 WATERLOO ROAD, CLEVELAND 10, OHIO

HOMER **IS STILL ALIVE** *and RARING to GO*

Like many of our friends and associates, we are engaged practically 100% in War Work . . . being located in the center of the world's greatest industrial and manufacturing area. Therefore, the manufacture of Cast Iron Furnaces and Replacement Parts must be . . . and has been . . . temporarily suspended for the duration of the war. We sincerely hope and believe that our good customers of many years' standing will bear with us during this crisis.

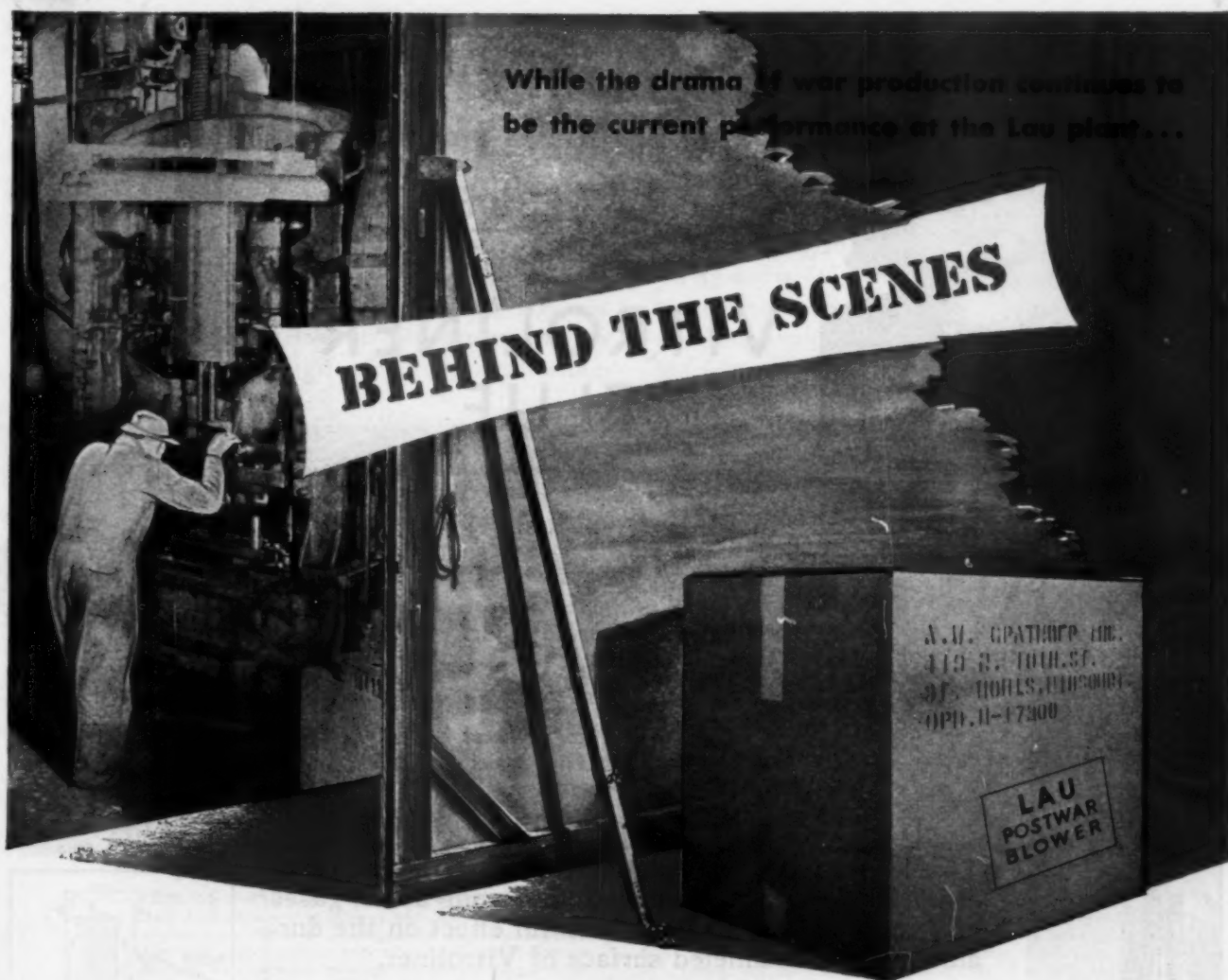


GOOD NEWS!

Plans and equipment for Post War Production are complete . . . and HOMER will step forth as one of the leaders in the manufacture of CAST IRON ROUND CASED GRAVITY FURNACES and REPLACEMENT REPAIR PARTS for all makes of Warm Air Furnaces and Boilers. . . The high quality and efficiency that have made the name HOMER synonymous with satisfaction and a household term in thousands of homes from one end of our nation to the other will once again assume its old and time-honored meaning . . . the "tops" in warm air heating and repair parts for all makes of Warm Air Furnaces and Boilers.

Distributors and Jobbers - - Please Write

HOMER FURNACE & FOUNDRY CORP.
COLDWATER, MICHIGAN, U. S. A.



NEW IMPROVEMENTS IN LAU BLOWERS

await our presentation to a peacetime audience

We'll divulge all the details of recent Lau Blower improvements the moment the lid is off present-day restrictions . . . when our government and war-essential contractors to our government no longer require the limits of our production . . . when the general need for blowers in industry and for commercial purposes can be supplied. Lau Blowers which you

will be able to obtain after the war will have new scroll dimensions — im-

proved wheel design and performance—and they'll be obtainable at still lower costs as a result of Lau straight-line mass production. Look to Lau to continue to lead in the blower field. If you now are planning your postwar equipment including blowers, be sure to contact us so that we can keep you posted regarding our product development.

The majority of Lau Blower equipment is going into direct and indirect war applications. However, we are producing a limited quantity of furnace blower package units which are available on proper priority. Contact your nearest Lau jobber.



LAU

BLOWER COMPANY

DAYTON 7, OHIO, U. S. A.

WORLD'S LARGEST MANUFACTURER OF FURNACE BLOWERS

Engineers and fabricators of general Air Handling Equipment • Single Inlet and Double Inlet Blowers • Propeller Fans • Accessories



Package Units



Blower Assemblies



Propeller Fans



Blower Wheels



YOUR HEATING EQUIPMENT WILL OPERATE BETTER WITH A VITROLINER FLUE



The Vitroliner Flue is now listed by Underwriters' Laboratories for all fuels—oil, coal, gas, wood, etc. The Vitroliner Flue replaces the standard masonry chimney and guarantees peak performance for all types of heating equipment.



Photo of Testing the
Vitroliner Flue in
Underwriters
Laboratories

Complete and exhaustive tests for safety were made under every possible condition. Temperatures were recorded at all points along the flue. The Vitroliner Flue was found safe in every respect.

- By actual test —
- Vitroliner has a higher potential draft.
 - Reaches efficient operating temperatures within minutes—not hours.
 - Thru draft control will produce a lower consistent minimum or a higher unvarying maximum.
 - The Vitroliner Flue is engineered to the draft requirements of your heating equipment.

This superior flue is designed to withstand and carry away all products of combustion. Strong acids, gases and condensation have no harmful effect on the durable vitreous enameled surface of Vitroliner.

Vitroliner requires no foundation of any kind, can be installed in any part of the house, suspended from ceiling or floor. The cost of Vitroliner is less than the cost of masonry construction, with practically no maintenance cost. Can be completely installed in a few hours and has extremely long life.

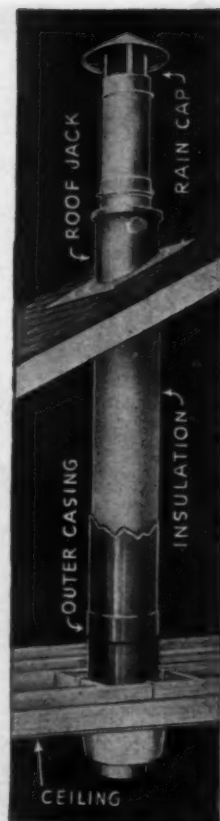
We invite furnace manufacturers to test the Vitroliner Flue now.

The Vitroliner Flue consists of lengths of acid-resisting vitreous enamel coated heavy-gauge metal pipe with welded seams and bell and spigot joints, insulated with a high temperature prefabricated Fyrex Asbestos Insulation, 1 in. thick. The vitreous enameled outer casing of metal extends the length of the Flue and completely covers the insulation. Over 30,000 now installed in Government Projects.

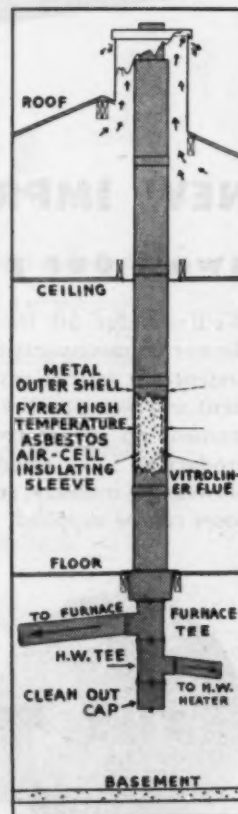
TYPE "E" VITROLINER FLUE IS NOW AVAILABLE ON AA-3, MRO PRIORITY

Write for free circular today

CONDENSATION ENGINEERING CORPORATION
122 SO. MICHIGAN AVENUE - - - - - CHICAGO 3, ILLINOIS



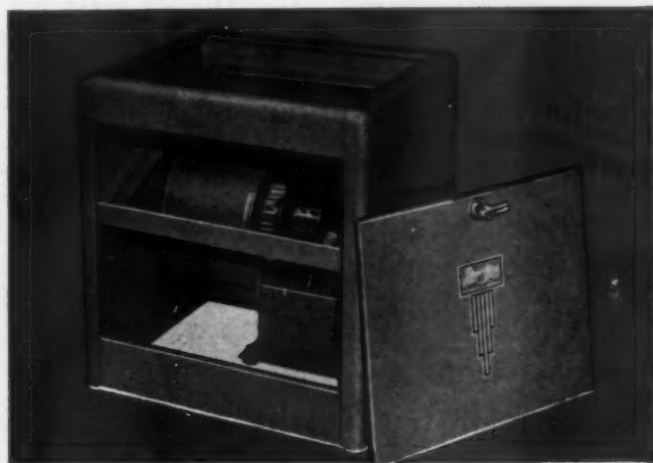
Showing Construction
of Type "E"
Vitroliner Flue



MAKE *Peerless* YOUR HEADQUARTERS FOR PACKAGE UNITS AND BLOWERS

MORE than 50 years of experience in building quality motors and electrical apparatus have given Peerless the "know-how" that enters into the design and manufacture of Peerless equipment for winter air conditioning and forced air heating.

Peerless equipment is complete—manufactured entirely in our own modern plant—*not in assembled line*. Peerless equipment is priced right—bigger profits for you. And Peerless equipment is dependable—reducing service worries on your part.



PEERLESS AIRBOY DIRECT DRIVE BLOWER

Here's a direct drive blower that delivers 850 cubic feet of air per minute—sufficient for a house of approximately 10,000 cubic feet. 3-speed motor with motor blower unit rubber cushioned. Blower wheel dynamically and statically balanced, a very compact unit of attractive appearance, shipped assembled, ready to work.



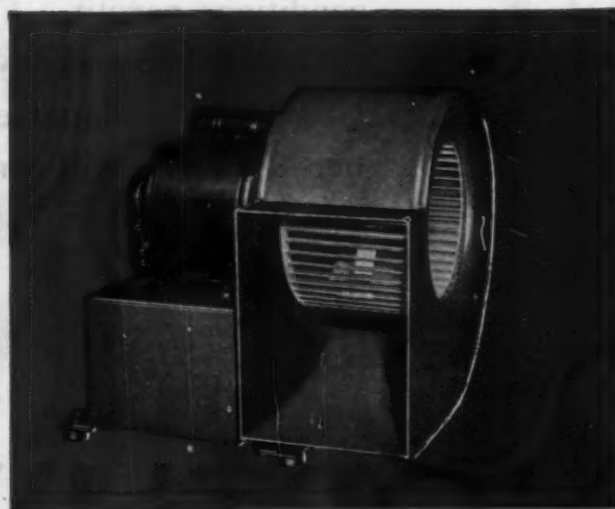
PEERLESS BELT DRIVE PACKAGE UNITS

These units feature a new modern cabinet of rounded corner construction. Each unit is complete—ready to be installed and includes cabinet, Peerless blower, Peerless motor, filters, belt, pulleys, automatic belt tension device, bonnet control and felt pads. A variable pitch motor pulley provides speedy adjustment for winter and summer use. Sizes from 9" to 21". 9" to 15" sizes shipped completely assembled.



BLOWER ASSEMBLIES—BELT AND DIRECT DRIVE

Belt drive assemblies with either top or rear mounted motor arrangement for those who incorporate this blower in their own furnaces or make up their own cabinets. Motors on both types are mounted with resilient bases to prevent vibration. Direct drive assemblies use specially designed Peerless capacitor motors that are exceptionally efficient and quiet in operation. Blower wheels, direct connected to motor, are forward curved, dynamically and statically balanced.



PEERLESS AIRBOY BLOWER ASSEMBLY

This is the same motor and blower unit, without cabinet, that is used in the Airboy Package unit. Note the compactness of the complete assembly. The two motor bearings are the *only* bearings in the unit.

THE PEERLESS ELECTRIC COMPANY, WARREN, OHIO

We're having our troubles, too ...but *NOT WITH QUALITY!*

LIKE everyone else we're having our troubles with manpower and sometimes with deliveries of furnace repair parts . . . *but we're having no trouble with quality!* Northwestern repair parts are still the finest you can obtain . . . they will always give you greatest satisfaction.

When you need parts for any job try Northwestern first! Your order will always receive our best attention and you can be sure that we will always carefully guard quality for you . . . and make deliveries as promptly as supplies and conditions permit.

Continue to make Northwestern Stove Repair Company headquarters for your repair part needs . . . you will continue to get quality parts and the best possible service under today's conditions.

NORTHWESTERN STOVE REPAIR COMPANY

662 WEST ROOSEVELT ROAD

CHICAGO, ILL.

STANDARD
IN THE INDUSTRY



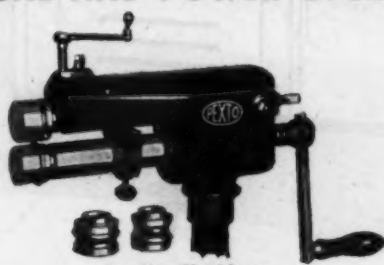
THROUGH
160 YEARS

MACHINES AND TOOLS

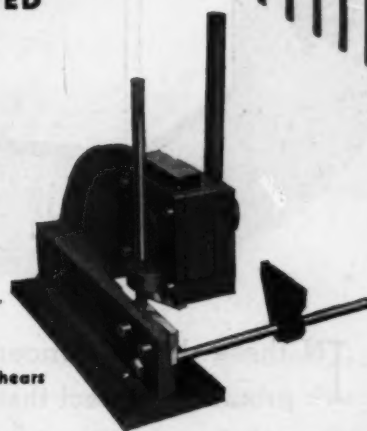
FOR MODERN SHEET-METAL FABRICATION
MANUAL AND POWER OPERATED



Combination Electric Rotary Machines



Beading Machines



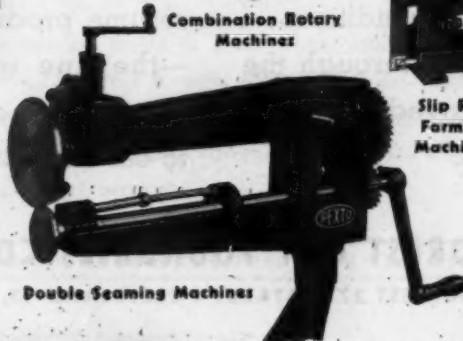
Slitting Shears



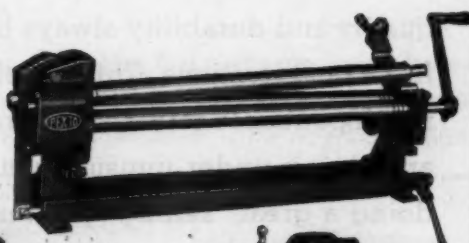
Combination Rotary Machines



Squaring Shears



Double Seaming Machines



Slip Roll
Forming
Machines



Crimpers and Beaders



Grooving
Machines



Adjustable Bar Folders

THE PECK, STOW & WILCOX COMPANY SINCE 1785 SOUTHINGTON, CONNECTICUT



IN these days of uncertainties we are proud of the fact that during our 53 years of manufacturing experience, quality and durability always have been first considerations. This is reflected in the dependable service Niagara furnaces are giving under unusual conditions... doing a great "selling" job through the satisfactory heating enjoyed by thousands of Niagara owners.

Today Forest City Foundries workers are carrying on the vitally important task of producing materials needed to win the war. When peace comes, this personnel and improved manufacturing facilities will be ready quickly to resume production of Niagara furnaces—the line which loyal dealers have learned can always be depended upon to earn *bankable* profits.

THE FOREST CITY FOUNDRIES COMPANY

2500 WEST 27TH STREET • CLEVELAND 13, OHIO

NIAGARA

GRAVITY AND FORCED AIR FURNACES



UNNECESSARY SERVICE

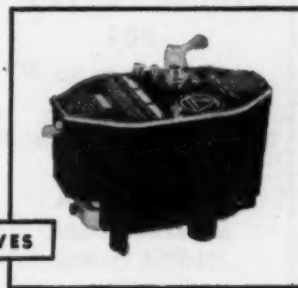
MAKES PROFITS FLY AWAY



Many an oil heating dealer has found out at the end of the year that unnecessary service calls have put him in the red. That's why he's anxious to sell equipment that requires a minimum of service and attention.

This fact has long been realized here at "Detroit". That's why we have designed "DL" Float Valves so that they can be disassembled and cleaned in a few minutes time without the need for wrenches or special tools. A screwdriver is the only tool required.

Keep the service angle in mind when you are selecting a line of oil heaters to sell. Most service on vaporizing burners consists merely of cleaning. By insisting on heaters equipped with "DL" Float Valves, you can assure yourself of a minimum of service.



INSIST ON PRODUCTS EQUIPPED WITH "DL" FLOAT VALVES

DETROIT LUBRICATOR COMPANY

General Offices: DETROIT 8, MICHIGAN

Canadian Representatives—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, MONTREAL, TORONTO, WINNIPEG

Division of **AMERICAN RADIATOR & Standard Sanitary** CORPORATION



"DL" Heating and Refrigeration Controls • Engine Safety Controls • Safety Float Valves and Oil Burner Accessories • Radiator Valves and Balancing Fittings • Arco-Detroit Air and Vent Valves • "Detroit" Expansion Valves and Refrigeration Accessories • Air Filters • Stationary and Locomotive Refrigerators.



In Wondrous Days to Come

"When a ration book is just a souvenir" . . . when
the shooting's through and fighting men are home
again . . . when war time excuses for inefficiency and
poor service are forgotten . . .

In the wondrous days of peace to come, the makers
of Wise Furnaces will continue to make the
best for you and for your customers. If you are not
"up" on Wise dealerships, now is a good time to
get in "on the know." Write us today . . . get all the
facts . . . be in on the best deal the industry offers.

THE WISE FURNACE CO.

AKRON, OHIO

*Now in Our 41st Year of
serving our customers faithfully and satisfactorily*





FULL MEASURE

You Get It in **SUNLIGHT MOTORS**

For more than 28 years, Sunlight motors have been built on the policy of providing full measure. There is no skimping on materials, either in quantity or in quality. There is no cutting corners on design.

Proof of the extra value built into Sunlight motors can be found in the features that safeguard performance: the extra-heavy coatings of dielectric insulation that protect motor windings—the extra power that provides up to three times rated starting capacity—the full-gauge copper wire to cut down heat generation—the diamond-bored bearings, set in self-oiling cast bronze journals.

Best proof, though, is the trouble-free performance provided by Sunlight motors in millions of homes, where they drive leading makes of electrical appliances. Manufacturers and dealers know they can depend on Sunlight motors for full measure—in years to come as in years past.

Packard Electric Division, General Motors Corporation, Warren, Ohio
Dependable Appliance Motors for Twenty-Eight Years



SUNLIGHT MOTORS FOR:

AIR COMPRESSORS
WASHING MACHINES
POWER-DRIVEN BENCH TOOLS
IRONERS
MILK SEPARATORS
MILKING MACHINES
FURNACE BLOWERS
STOKERS
OIL BURNERS
WATER PUMPS
REFRIGERATORS
VENTILATORS
AND MANY
OTHER APPLICATIONS

**KEEP BUYING
WAR BONDS**

RATIONING PROVES



Gar Wood

EFFICIENCY

These homes in

DREXEL HILL, PENNSYLVANIA

are part of a community of fifty developed by J. S. Mozino and Company.

They are typical of suburban construction—average 6.1 rooms, 1.5 baths, are all Gar Wood equipped and sold for \$7,000 to \$9,000. Under the rationing formula, homes with the most efficient heating equipment were cut the least percentage.

Average cut Philadelphia area 29.0%

Average cut Gar Wood equipped 18.9%

FUEL CONSUMPTION 28% BELOW AVERAGE

Average prewar Philadelphia area Gal. sq. ft. 1.18

Average prewar Gar Wood equipped Gal. sq. ft. .85

These are average figures, not the outstanding performance of one unusual installation. The amazing oil economy of Gar Wood units is built in at the factory. It arrives in package form for the dealer to install.

INVESTIGATE THE GAR WOOD FRANCHISE FOR YOUR COMMUNITY

Gar Wood **HEATING DIVISION**

GAR WOOD INDUSTRIES, INC.

DETROIT 11, MICHIGAN



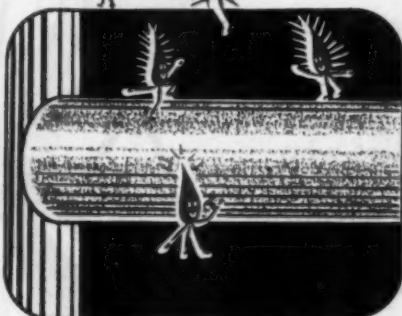


HAVE YOU SOLVED IT? THE MYSTERY OF THE MISSING DRAFT



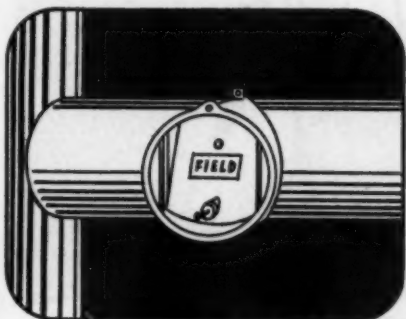
ACT ONE:

Here's a dealer with a *problem*. His heating installations — a leading line — are not *performing*! Customers are complaining; his line is getting the blame.



ACT TWO:

But here's the villain — a smoke pipe without a control! Heat losses up to 25% originate right here. And the heating unit and the dealer take the blame for this *fuel waste*.



ACT THREE:

And here's the *solution*: A Field Barometric Draft Control. It automatically compensates for draft variations, holding draft to a *minimum*. Result: Better performance, *fuel savings* ranging up to 25%.



ACT FOUR:

Now, the *customer* and the *dealer* are *happy*. Fuel consumption is *down*, performance is *up*. FIELD is on the job, and a good heating unit is performing flawlessly. Moral: Make a Field Control *standard equipment*.

BAROMETRIC

DRAFT CONTROLS

field

FIELD CONTROL DIVISION OF H. D. CONKEY & COMPANY, MENDOTA, ILLINOIS

HERE'S WHY FIELD
IS THE MOST
EFFICIENT
DRAFT CONTROL
MADE

GATE BALANCED
AT FACTORY

MADE OF HEAVY
MATERIAL

DOESN'T CRACK
OR WARP

ROLLING TYPE
HINGE PIN

QUICKLY
RESPONSIVE

FREE SMOKE
PASSAGE

ROCKER TYPE FULCRUM

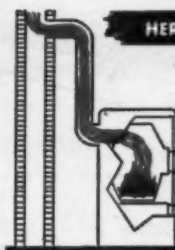
It's the action of the old rocking chair — the hinge pin rolls in slots. Instead of twisting in journals. This design means less friction, and less friction means no binding, no oiling, no corrosion; years of trouble-free service.

OFF CENTER GATE MOUNTING

The gate, mounted off-center for greater sensitivity, moves closely between two side wings. The air opening increases more uniformly; barometric pressure operates on a greater effective gate area. Thus sensitivity is increased without sacrificing durability.

EXTENDED HOUSING

This design places the gate — even in wide open position — outside the flow of gases from the heating unit. Thus the Field Control is not readily fouled by soot, nor will the gate warp from heat. This means longer operating life, no service calls, uniform regulation.

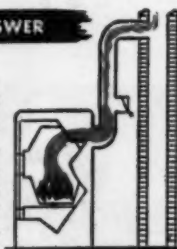


HERE'S YOUR PROBLEM

Excessive, uncontrolled chimney drafts draw heat up the chimney. Fuel wastes up to 25% are caused, the efficiency of the heating unit radically affected.

HERE'S YOUR ANSWER

The Field Draft Control automatically holds chimney draft to a minimum, makes a good heating unit work like a charm. A "must" for every installation.



Round Oak is on the march!



The aggressive post-war program of this 74-year-old company promises increased volume and profits to dealers who fly the Round Oak flag. Open territories are already being closed. Correspondence with leading dealers is invited. Write in confidence, on your letterhead, to

Richard D. Nugent

Richard D. Nugent, President
ROUND OAK COMPANY • DOWAGIAC, MICHIGAN



ROUND OAK'S POST-WAR LINE WILL INCLUDE

★ KITCHEN APPLIANCES

Gas Ranges
Electric Ranges
Gas Combination Ranges
Electric Combination Ranges
Kitchen Heater Gas Ranges
Coal and Wood Ranges
New Kitchen Heaters

★ HEATING EQUIPMENT

Steel Furnaces
Cast Iron Furnaces
Gas, Oil, or Coal
Air Conditioning Systems
Space Heaters
Electric Water Heaters
Gas Water Heaters
Oil Water Heaters
Stokers
Blower-Filter Units



"TOMORROW'S HOME WILL BE A BETTER HOME
IF EQUIPPED WITH ROUND OAK PRODUCTS"

ROUND OAK

"A Grand Old Name"

HEATING EQUIPMENT

KITCHEN APPLIANCES



3 Specialists WORTH KNOWING

Steel sheets identified by these trademarks are specialists, made to meet everyday needs particularly well.

Popular Continental SUPERIOR GALVANIZED is uniformly tempered for good workability. It handles well, solders well and is highly uniform—ideal where you need a commercial galvanized sheet. Continental SUPERIOR CHECKERCOAT is galvanized with bright, checkered spangles. It's a fine sheet where you want smart appearance. And Continental SUPERIOR COPPERIOR is made of copper steel for greater rust resistance.

Continental Steel Corporation and its subsidiary, The Superior Sheet Steel Company, produce galvanized sheets well-known for quality. Get acquainted with these sheets. Ask your jobber about them today.



CONTINENTAL

STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF:

MANUFACTURER'S WIRE: Bright, Annealed, Galvanized, Coppered, Tinned, Liquor Finished, Lead Coated, Special wire, etc. Also Chain Link Fence, Nails, etc.

STEEL SHEETS: Black, Galvanized, Hot Rolled Annealed, Hot Rolled Pickled, Long Terne, Copperior, Lead-Sealed, Galvannealed, Super-Metal, etc.

THE SUPERIOR SHEET STEEL COMPANY, DIVISION • CANTON, OHIO

Mr. Contractor . . .



simplify your

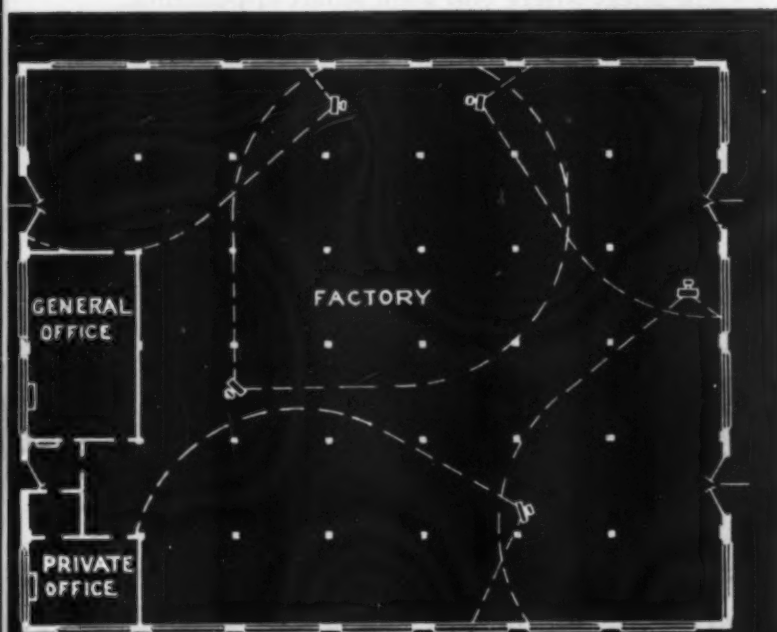
HERMAN NELSON's extensive line of heating and ventilating products and nation-wide distribution make it possible for you to simplify your jobs in all types of industrial, commercial and public buildings.

For example: in the small manufacturing plant shown below, proper air conditions can be maintained through the use of a number of Herman Nelson Products.

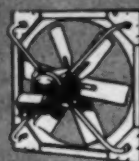
The main manufacturing area would be heated by five Propeller-Fan Type Unit Heaters. The same space would be adequately ventilated by two Belt Drive Propeller Fans. DeLuxe Unit Heaters would heat the private office and the reception hall, while the general office, occupied by a considerable number of persons, would be heated and ventilated by a Unit Ventilator. In addition, Direct Drive Unit Blowers would be used for exhausting air from paint booths, degreasing tanks or other special applications of this type required for manufacturing operations.

Herman Nelson Quality Products will solve heating and ventilating problems in all types of industrial, commercial and public buildings as they do in the small plant illustrated. Any of the Product

Application Engineers or Distributors listed on the next page will be pleased to cooperate with you in the selection and application of the correct Herman Nelson Equipment to provide most satisfactory results.

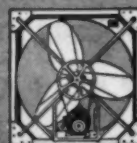


**Application of Herman Nelson Products
in small industrial plant**



**Herman Nelson
Direct Drive
Propeller Fans**

**Herman Nelson
Belt Drive
Propeller Fans**



**Herman Nelson
Propeller-Fan Type
Unit Heaters**

Herman Nelson products will heating and ventilating jobs

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The Roekel Company
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Strong, Carlisle & Hammond Co.
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The Tholen Bros. Supply Co.
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The Topeka Steam Boiler Wks., Inc.
Topeka, Kan.
Trimble & Lutz Supply Co.
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Manchester, N. H.
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Springfield, Ill.
Tay-Holbrook, Inc.
San Francisco, Calif.
Dallmann Supply Company
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Calif.

THE HERMAN NELSON CORPORATION

Manufacturers of Quality Heating and Ventilating Products

GENERAL OFFICES: MOLINE, ILLINOIS • FACTORIES AT MOLINE AND CHICAGO, ILLINOIS



Herman Nelson
Self Drive
Unit Blowers



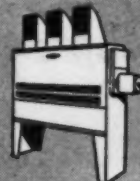
Herman Nelson Vertical
Shaft Propeller
Type Heaters



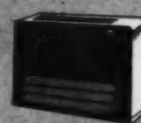
Herman Nelson
Centrifugal
Fan



Herman Nelson
Direct Drive
Blowers



Herman Nelson
Blower-Fan Type
Heaters



Herman Nelson
De Luxe Heaters



Herman Nelson
Unit Ventilators



Gleam in the eye

What's the state of your postwar product . . . or project? Is it just a gleam in your eye—a sketch on a scratch-pad—or a design on the drawing board?

Whatever stage it's in, you can profitably give thought to sheet steel as the material to use. What other material offers so much—such workability and versatility, such strength for its weight and volume—at so little cost?

Bethlehem makes sheets for all purposes. Deep-drawing sheets, capable of being formed in ways that were undreamed-of a few years ago. Galvanized sheets for ductwork, roofing and many other uses.

Sheets for painting, enameling and special finishes. Beth-Cu-Loy (copper-bearing) sheets that provide two to three times ordinary corrosion-resistance. Mayari R sheets, rolled from Bethlehem's high-tensile, corrosion-resisting, low-alloy steel. And many others.

Let's put our heads together over your present and future plans. Let us help you in determining where and how sheet steel could be used to your advantage in the products you'll be making after the war. Get in touch with the nearest Bethlehem district office or write to Bethlehem Steel Company, Bethlehem, Pa.



Bethlehem Steel Sheets

WE ARE DEDICATED

IN WARTIME

To the machining of high precision equipment to the exacting specifications and for the use of the military and naval forces of our country.

IN PEACETIME

To the manufacture of warm air heating equipment to the highest possible standard of quality for distribution exclusively to other manufacturers and wholesalers.

AT ALL TIMES

To the application of the soundest and most effective engineering and production methods to the highest quality materials obtainable.

MAYFLOWER AIR-CONDITIONERS, INC

St. Paul

Minnesota

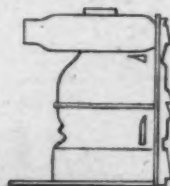


A Finer Line than ever - - - *when the War is over*

Since 1843, INTERNATIONAL and its predecessors have been called upon to take some part in each of our country's wars. Again, in this war, we have done our part, to the utmost of our ability. And we shall continue until there is no longer the need.

But for after the war, INTERNATIONAL has already developed plans for new and startling improvements in the heating field — and a finer-than-ever line of Warm Air Furnaces, Winter Air Conditioning Units, Furnace Pipes, Fittings, Smoke Pipe and Elbows.

You'll be hearing more about INTERNATIONAL's plans soon. And they will be worth your attention and consideration. Meanwhile we are making every effort in our power to take care of as much of our customers' needs as is possible under the circumstances.



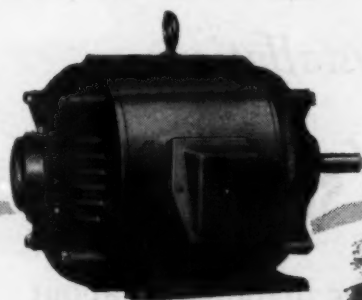
INTERNATIONAL

HEATERS & COMPANY

UTICA, N.Y., U.S.A.

WESTERN OFFICE AND WAREHOUSE • 1933 WENTWORTH AVE., CHICAGO, ILL.

You Increase Customer Good-Will When You



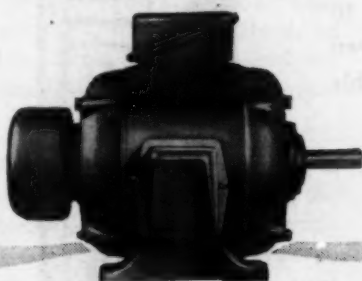
Type RS Repulsion Start Induction
Brush Lifting Single Phase Motor.
Built in sizes 1/3 to 20 Horsepower



Type SC Squirrel Cage Induction
Three Phase Motor.
Built in sizes 1/6 to 600 Horsepower



Type DN Direct Current Motor
Built in sizes 1/20 to 300 Horsepower



Type CSH Capacitor Start
Induction Motor
Built in sizes 1/20 to 20 Horsepower

Select Quiet CENTURY MOTORS for Air-Conditioning!

There's a complete line of Century motors to meet every air conditioning application. There are many good reasons why Century motors are widely used throughout the air conditioning industry. Here are a few of them: close tolerances on all moving parts, freedom from electrical and mechanical vibration, unique bearing bumpers that reduce chatter from V-belt irregularities.

Century offers motors for these air conditioning applications — refrigeration compressors, unit heaters, blowers, pumps, stokers.

**These are the types from which
you may choose:**

Single Phase	Open	Cushion Mounting
Polyphase	Totally Enclosed	Rigid Mounting
Direct Current	Dust Proof	
	Drip Proof	
Vertical	Splash Proof	Ball Bearing
Horizontal	Explosion Proof	Sleeve Bearing

Find out today how the smooth operation, protective insulation, rigid construction, and many other features work together to give your customers more satisfaction through more comfortable air conditioning. Call in a Century engineer.

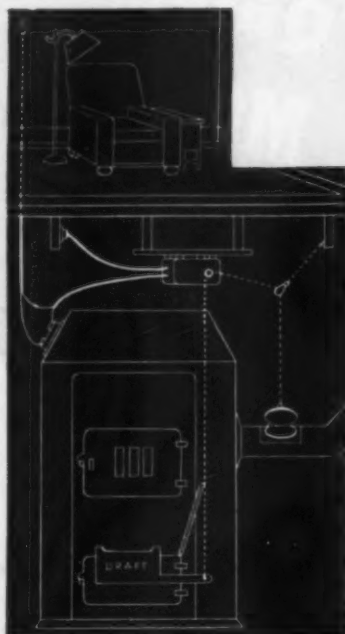


CENTURY ELECTRIC COMPANY, 1806 Pine Street, St. Louis 3, Missouri

Offices and Stock Points in Principal Cities

412

Speed Up Your Heat Control Installations



CRISE CONTROLS SAVE TIME

The Crise control can be installed in about half the time required by other controls—it saves you valuable time on each job. There is no separate transformer, no arms or levers, no tricky adjustments. Only safe, low-voltage wires connect in simple circuit from motor to thermostat to Limit Control, which mounts on furnace *exterior*. You can install a Crise control speedily—save time.

MORE PROFIT TO YOU

Saving time puts money in your pocket, because you can handle more jobs. And the Crise Control is priced to allow you a good profit on its sale. Trouble-free operation

and fuel economy will make you new friends and customers—bring you profitable repair business. You'll make money on Crise — and because of Crise.

SAVES FUEL in any hand-fired furnace

The electrically operated Crise heat control saves fuel—up to 1½ tons in the average home—quickly pays for itself. And even with this saving, the Crise control insures uniform, comfortable temperature throughout the house.

*Put yourself in the money—start pushing Crise Controls. Get in touch with your jobber
—or write us—TODAY!*

CRISE MANUFACTURING CO.
COLUMBUS 16, OHIO





The Problem of Cooling Off a Hot-Headed Building

... doesn't bother Allen Engineers

High temperature relief problems should not be approached with the glib idea that anything between thirty and sixty air changes an hour in a building will be adequate. That is guesswork, and it is almost as simple and much safer to eliminate the guesswork and use a common-sense scientific approach.

There have been many large area ventilating devices sold during the war period, which, in our humble opinion, should not have been so sold or specified (unless one uses the alibi that fan equipment was not

available under the then existing priorities). On the other hand, there are equally outstanding jobs where the use of fans for high temperature relief is wholly unjustifiable. We have yet to find a job where the plant engineer could not tell us the actual heat input used for process in the building suffering with the hot head. Knowing this data, a precise calculation is possible, showing the expected temperature difference that can be maintained in the building, as well as a figure showing the expected velocity of gravity flow due to temperature

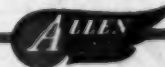
difference and height between inlets and outlets (commonly called stack effect).

With these figures as a base, it is only necessary to look in a price book and determine whether or not gravity equipment or fan equipment will be the least expensive over a period of time. Allen always follows this sound procedure in attacking a high temperature relief problem and bases its recommendation on outlet temperatures agreed upon between Allen and the customer. In this way final results are always satisfactory. We are always ready to talk shop with you. *The Allen Corporation, 9751 Erwin Avenue, Detroit 13, Michigan.*

THE *Allen*

CORPORATION

ENGINEERED VENTILATION FOR INDUSTRY



Designed to Cut,
Cut Fast and
Keep cutting



Whether you use snips or sell them . . . cutting ability is their prime virtue. Crescent Snips are well known for their fast, easy cutting. They should be because they were designed for that purpose alone. Special methods of grinding are used to assure absolute uniformity with the master pattern. Balance and proper leverage are also part of Crescent Snips appeal to experienced mechanics . . . they "feel" right as well as *cut right*.

Crescent Snips . . . like other famous Crescent Tools . . . have been "off to the wars," but some day soon we hope, they'll be back in the hands of good mechanics and readily available over the counters of good hardware dealers everywhere.

CRESCENT TOOL COMPANY, JAMESTOWN, N. Y.

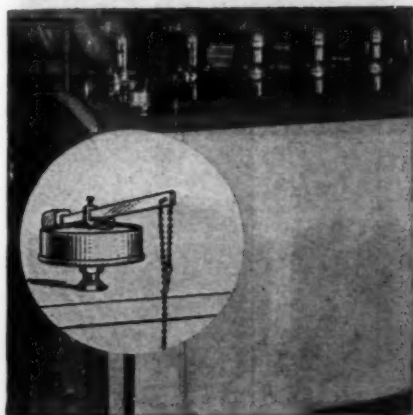


CRESCENT TOOLS

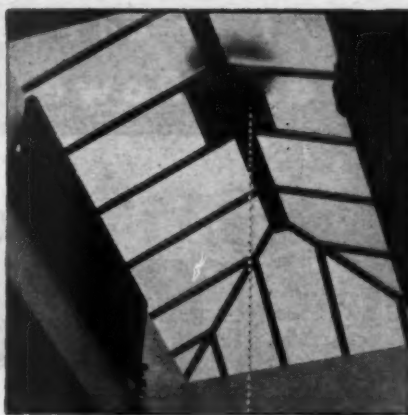
Give Wings to Work



BEAD CHAIN — KINKLESS — ADJUSTABLE



Furnace damper regulator chain



Skylight pull chain



Ventilation pull chain

Kinkless BEAD CHAIN is attractive and durable. With suitable attachments its length can easily be adjusted. It is made in many metals and finishes. Uses—Ventilator and Skylight Pull Chains . . . Boiler and Furnace Damper Regulator Chains . . . Warm Air Register Chains . . . Remote Control Chains.

BEAD CHAIN AVAILABLE IN SPOOLS AND SPECIAL LENGTHS

BEAD CHAIN for trade use is sold in spools of 250 ft. of No. 13 and 500 ft. of No. 10. A and B type couplings ((C) and (F) below) and other terminals and fittings are packed in bulk. Special lengths of BEAD CHAIN supplied on order. Complete assemblies with terminals if desired.

STANDARD SIZES OF BEAD CHAIN

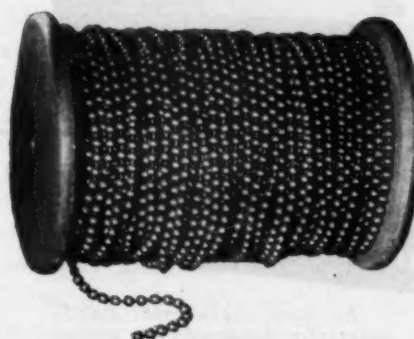
Nos. 10 and 13 most generally used for heating and air conditioning installations.



No. 13— $\frac{1}{4}$ " dia.



No. 10— $\frac{1}{8}$ " dia.



BEAD CHAIN ATTACHMENTS



These parts are made in sizes and metals corresponding to chains. Order by chain number. (A) Detachable pendant. (B) Non-detachable pendant. (C)—

A-type coupling. (D) Cord and chain connector. (E) Plastic pendant. (F) B-type coupling. (G) Coupling hook. (H) Ring pendant.



BEAD CHAIN

BEAD CHAIN is made by the Multi-Swage Process . . . the most economical method of producing small metal parts of close tolerances without waste.

THE BEAD CHAIN MANUFACTURING COMPANY

105 MOUNTAIN GROVE ST., BRIDGEPORT 5, CONN.

CSE

BAROMETRIC DRAFT CONTROLS

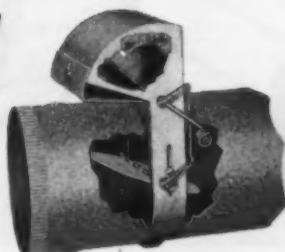
for every type and size of

Heating and Power Plant

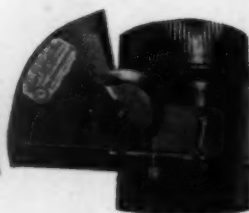


Cole DRAFT Governor

For oil, coal and gas fired heating and power plants, domestic, commercial, industrial — any size. Fully automatic, accurately balanced at factory, can be installed on any angle without taking down pipe. Holds draft to the IDEAL MINIMUM for clean, efficient combustion, effecting fuel savings up to 35%.



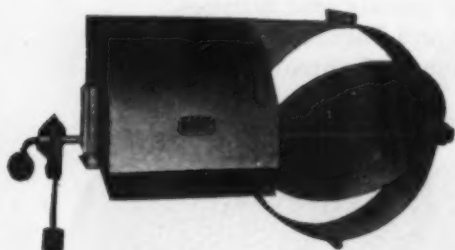
Standard domestic round Cole Draft Governor, sizes 5" to 18".



Five and six-inch standard space heater control, Type A, as shipped.

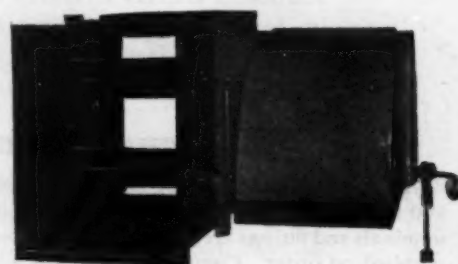


Six-inch De Luxe space heater control, Type C as shipped.



Left—Size 14" or over, side mount round Cole Draft Governor.

Right—Any size, side mount rectangular Cole Draft Governor, shown installed in section of smoke pipe.



Sullivan Draft Stabilizer

An open-check draft stabilizer especially designed for stoker and oil-burner operation. Can be mounted either on side or top of pipe. Models for all standard domestic pipe sizes from 7" through 18",—and for any size or type industrial installation.



Above — Standard industrial round Sullivan Draft Stabilizer.

Right—Standard industrial square Sullivan Draft Stabilizer. All industrial stabilizers are equipped with ball bearings.



Draft KoreKtor

A low-cost, open check control with an enormous domestic installation market. Ideal for coal installations, automatic or hand fired. Large, close-fitting blade swings on knife-edge, non-clogging pivots. Easily, quickly installed, requires no servicing. 10% to 25% fuel savings.



Left—Type F, 906, 6" diameter Draft KoreKtor, for stoves and heaters. Has convenient outside draft adjustment, patented. Delivered as shown with long tee side.



Above—Type F, 909 and 912, Draft KoreKtor. Equipped with universal sleeves to fit all standard domestic pipe sizes from 7" through 13". New outside draft adjustment is rust-proof, positive locking.

We know that "Fuel Saving Begins With Control." Our entire effort is in the manufacture of a complete line of draft controls to serve you, your customers, and Uncle Sam during this critical period. Write us today—

Cole-Sullivan Engineering Co.

1316 North Third Street
Minneapolis 11, Minn.

For steady postwar *profits* Handle Fluid Heat's Complete Line

ARE you a sales-minded heating dealer, interested in a *complete* line of nationally-known and sure-selling heating equipment? If you are, be the first in your area to file your name with Fluid Heat. Fluid Heat will be, even more than in the past, a profitable line to handle, and this is your chance to step in on the ground floor. Here is what Fluid Heat offers you:

1 A complete line of home-heating equipment to sell. Included are 9 oil burners, 8 air-conditioning furnaces, 7 burner-boiler units and a 40-gallon water heater. Behind them are Fluid Heat's valuable wartime experience in the design and construction of aircraft and truck heaters plus our seventeen years of pioneering in the development and manufacture of automatic combustion and heat transfer equipment. This will make Fluid Heat domestic heaters a still better "buy" than in the

past—and a still more profitable line for dealers.

2 Two big markets in which to sell them. These are the "new homes" market and the "replacement" market. Forecasts indicate that 900,000 new homes will be built during each of the early postwar years—and that millions of present home-owners are eager to *replace* their present heating equipment. *Inquiries and requests we've already received indicate that Fluid Heat will be a big seller on both markets.*

That's the Fluid Heat picture: a *complete line* of nationally-known home-heating units—and *two big markets* to sell them on. If you're a profit-minded dealer interested in that kind of set-up, contact us and let's talk it over. Write, phone or wire: Fluid Heat Division, Anchor Post Fence Company, 6720 Eastern Avenue, Baltimore 24, Maryland.

fluid heat
PRODUCTS

"World's Economy Champion"

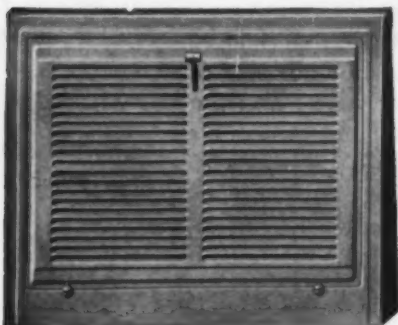
A PRODUCT OF THE ANCHOR POST FENCE COMPANY,
BALTIMORE, MD., ESTABLISHED 1892

A Word of Welcome to Old and New Customers

Auer has been performing a vital war assignment in the production of aircraft and tank parts. However, we hope that, shortly, more of our facilities can be restored to our standard line of registers and grilles.

Improvements and simplifications in some of our products will be put into effect, and you may be assured that Auer will keep pace with all real advances in heating equipment.

On all types of registers, intakes, and flat metal grilles, for warm air or air conditioning systems—Auer will, as for many years past, be a reliable source of supply, a dependable index of quality.



No. 800 Heat-Rite 2-Piece Gravity Baseboard Register

Subject to prior commitments, we are NOW in position to furnish many standard items from stock. Auer Register Book, or Grille Catalog G, with price list, sent on request.

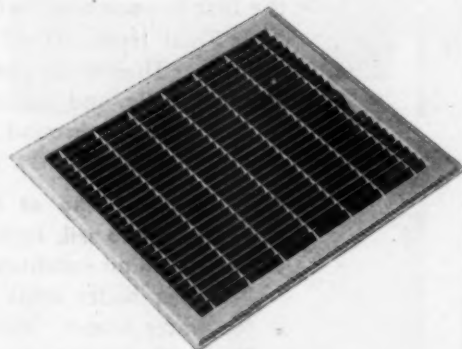
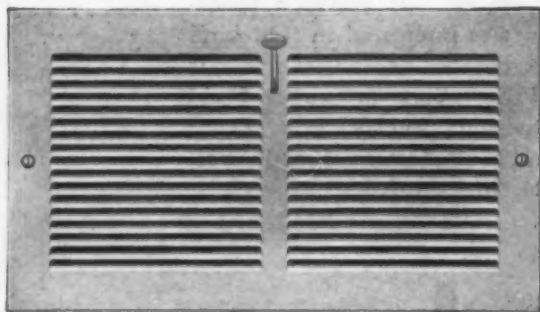
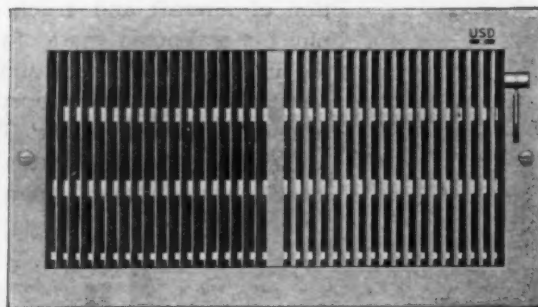


Fig. DR DuraBilt Floor Register



No. 7032 Airo-Flex Single Louvre Adjustable Face Register



No. 4432 Airo-Flex Multi-Louvre Adjustable Face Register

THE AUER REGISTER CO., 3608 Payne Ave., Cleveland 14, Ohio

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& GRILLES · For Air Conditioning and Gravity



THIS is the NEW CONCO Domestic Stoker seen through consumers' eyes. Three years unbroken research gave it that appeal — the streamlined styling, that improved engineering. Look at these **SALES FEATURES:** Lower, roomier, ventilated **HOPPER**; **INTER-PLANETARY TRANSMISSION** — eight teeth in constant contact work powerfully, silently; the **OVERLOAD PROTECTOR** eliminates need for a shear pin; the finest of **CONTROLS** are provided. And that's just the beginning. A few territories are still open to aggressive distributors and dealers. So write today for full details on the complete CONCO line — coal, oil and gas-fired.



CONCO
heat



Both Will See Something *New!*

"NEW," is a magic word in any sales presentation. And the NEW CONCO Domestic Stoker fills any consumer's estimate of what a post-war product should be. It's styled and engineered to appeal to the mind as well as the eye, a winner!

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Call Ryerson When You Need Steel

Every type of steel from stainless to structurals is immediately available from Ryerson stock. Just reach for the phone and call any one of the eleven conveniently-located Ryerson service plants. Our operators will connect you at once with an experienced

service man who will see that you get the steel you need—when you need it.

JOSEPH T. RYERSON & SON, INC.
Steel Service Plants: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston.

QUICK, DEPENDABLE SHIPMENT



Prospects for 1945

THE GREAT German thrust into American battle lines in December, plus the steadily expanding tempo of the war in the Pacific, have, in the last thirty days, completely changed the complexion of our home front situation.

The spectacular sweep of the Allied armies through France last summer undoubtedly raised our expectations too high and we let well intentioned commentators lull us into a too comfortable sense of "all's well." Should we now believe we were deliberately misled, or should we believe grievous errors in judgment were responsible matters little—you can take your pick.

But one thing is certain—all talk of early resumption of large scale civilian goods production is definitely out the window as we enter 1945.

WPB Summarizes Prospects

Our expectations for 1945 are pretty well summarized in the WPB internal policy order issued in the middle of December. In brief, this order says—WPB programs for the manufacture of civilian items will, in general, restrict quantities to the level allowed during the fourth quarter of 1944. The order applies particularly to "hard goods"—a classification which includes practically everything we use in the warm air heating—sheet metal industry. The order also says—

1—Increases in orders will not be allowed in excess of quantities clearly required to maintain essential war supporting activities in the civilian economy.

2—If military requirements for items on the order's List A are also programmed for civilian production (motors, furnaces, sheets) are decreased, no increase may be made in the level of production of that item for civilian use unless the area urgency committee determines in each factory the fact that a decrease in total production will not release workers, either locally or inter-regionally.

3—Any production authorized in excess of the approved level shall be undertaken under Priorities Regulation 25 and this has already been sharply restricted.

4—It will be the general WPB policy not to approve amendments or revocations of "L" or "M" or-

ders that would result in any increase of production over the levels authorized in the fourth quarter of 1944.

Even the briefest study of this order seemingly indicates that until the war takes a decided turn for the better our industry will get no more products in 1945 than we had in 1944 and in many instances fewer products because the fourth quarter was not as productive as previous quarters for many manufacturers. So let's see what we got in 1944 and forecast 1945 on that basis.

Furnaces

Early in 1944 AMERICAN ARTISAN forecast a total production of warm air furnaces of all types and for all fuels—for replacement purposes—of 200,000 furnaces. We understand that if the final production for November and December equalled October there will have been produced in 1944 270,000 furnaces of all types, sizes and for all fuels. This included approximately 111,000 steel furnaces, 147,000 cast iron furnaces and 12,000 gas and oil burning furnaces, both steel and cast.

Readers should keep in mind that this 270,000 total production included the furnaces used in *new housing*. AMERICAN ARTISAN has no report on the number of new houses completed in 1944 which used a warm air furnace, but we do have reports on total housing production as follows:

National Housing Agency reports that in 1944 a total of 277,657 accommodations for war workers were completed up to October 31 with an additional 81,812 under construction. Of those completed, 131,694 were financed by private capital and most of these were single family dwellings. The other 145,963 units were provided with public funds and 76,977 of these were family dwellings plus about 20,000 dormitory units.

It seems likely, in view of the fact that much of the 1944 construction was in areas having a mild climate, that half or less of these family dwelling units used a central furnace. A rough deduction, then, indicates that there were somewhere between 150,000 and 200,000 furnaces available in 1944 for replacement purposes.

What of 1945? If WPB's statement reported above holds true, this industry in 1945 will be permitted to produce only about the same number of furnaces as in 1944 and, again, 150,000 to 200,000 furnaces will be available for replacement purposes. Victory, for the Allies can, of course, change this.

Blowers and Motors

This industry tried, but mildly, in 1944 to convince WPB that a furnace blower is a fuel conservation device. We cited the fact that a furnace blower is as good a fuel saver as the circulating pump on a hot water boiler. Despite these efforts, 1944 closed with furnace blowers permitted only as replacements. AMERICAN ARTISAN believes, however, that blower manufacturers, in 1944 slowly received larger shipments of motors and were able, toward the close of the year, to ship more blowers with motors than were shipped in the first months of 1944. There are no figures to prove this, but WPB did report in December that "some increase in the production of motors is making it possible for manufacturers to ship several thousands each month for essential farm and civilian replacement use and repairmen needing small motors for oil burners, stokers, etc., should use the AA-3 rating of CMP 9A."

This, again, was only for replacement purposes so we failed to establish the all important point that furnace dealers should be permitted to sell blowers to save fuel.

As for 1945 we feel that production of standard fractional horse-power motors is slowly increasing. Completion of a \$5 million program to expand facilities for the production of fractional horsepower motors by the end of the first quarter of 1945 is expected by WPB. The increased production is expected to ease the present critical supply situation and to "get into" the backlog of unfilled orders for 4.8 million motors. Production of motors in the final quarter of 1944 is expected to average 450,000 units, as compared with 400,000 a month in the second quarter of 1944. A similar increase is scheduled for the first quarter of 1945. The B-29 bomber program of 1944 took more motors or motor production facilities than we counted on and probably will continue to do so in 1945. Our real hope is to convince WPB that blowers save fuel. Whether we can do so likely will depend on the progress of the war.

Oil Burners

WPB announced in October that under PR 25 materials would be allocated for 30,000 oil burners in the fourth quarter of 1944, but because of manpower shortages and slowness in getting materials and accessories and largely because the turn in the war closed down on most WPB help, this 30,000 burner schedule was never seriously approached.

Since manpower regulations are getting more stringent and materials and accessories harder to get, it seems likely that in 1945 we will get approximately 5,000 new burners per month—if the WPB order is adhered to.

Also affecting oil burner installation is the decreasing stocks of fuel oil in the large oil heating areas—this makes WPB reluctant to increase permission to manufacture or install.

Domestic Stokers

Like oil burners, WPB announced in October that materials would be allocated for 37,500 domestic stokers in the fourth quarter of 1944. But precisely the same difficulty arose as with oil burners and

WPB announced on December 18 that authorizations for production in the first quarter of 1945 would be subjected to more critical review. Industry Advisory Committee members have announced that not more than 50 per cent of the 37,500 stokers were actually produced in the fourth quarter. On this basis, and again believing the WPB policy order will be followed, it seems that the 75,000 stokers contemplated for 1945 will be drastically curtailed.

Heating Accessories

The situation in 1945 for filters, controls, humidifiers, automatic draft controls looks to be pretty much like 1944. Filters were in plentiful supply all through 1944, so far as we know, and there have been no changes in material requirements or manpower needs to warrant any great change in 1945.

Automatic draft controls (barometric dampers) and other controls received recognition as fuel savers early in 1944 and continue to be needed in 1945. Most of the instruments produced require no really critical materials beyond their needs of 1944 so production should continue at about the 1944 level.

Humidifiers were "frozen" months ago. Some manufacturers had substantial stocks on hand which carried them through 1943 and 1944. Other manufacturers had substantial stocks of semi- or finished parts and were given permission in 1944 to complete assembly. With copper and stainless steel still critical WPB may see fit to permit production of humidifiers using certain materials or parts on hand or may, on the other hand, prohibit production on the basis of manpower shortages.

Sheets

The production of galvanized iron sheets—one of the staple materials of our industry—was, for 1944, about 1,200,000 tons. This compares with a production of about 1 million tons in 1942 and about 1½ million tons in 1940.

But production, by itself, doesn't mean anything, because our supply of sheets depends upon whether or not the steel warehouses (jobbers) get sheets. When jobbers have sheets—we get them. When jobbers don't get sheets—we don't get them.

Probably figures are available to show what portion of sheet production was delivered by the mills to the jobbers, but we can only guess from what we have heard. Our guess is that jobbers got about 40 per cent or less of mill production in 1944. On this basis, jobbers should have passed along to users something like 48,000 tons of sheets.

But jobbers have been telling us right along that despite the fact they get sheets they can't distribute these sheets to the sheet metal trade because jobbers stocks are regularly cleaned out by high priority war contractors. So far as we know, nothing has been done to remedy this. Our industry can still order 20,000 pounds of sheets per quarter under CMP-4, but that doesn't mean we will always get our sheets.

During the first quarter of 1944 sheets were reported "very hard to get" and delivery six weeks or longer. Along in the summer and early fall, orders began to come through and deliveries shortened until we heard of contractors getting deliveries in about four weeks. In the fall things tightened up again and as 1945 begins, the situation is once more very spotty with some dealers claiming they are getting sheets and others saying they can't get a pound.

In the light of stepped-up war fabrication, and the order to curtail civilian usage, it seems wise to plan

(Continued on page 222)

Interpretations Amendments, Easements, To Existing Orders

L-142 Revoked

PROVISIONS controlling the manufacture and sale of metal doors, metal door frames and metal shutters have been removed through the revocation of Order L-142.

Only a small increase in production is expected as control will still be exercised through quarterly CMP allotments of materials. Demand for these products is limited by restrictions of the construction order, L-41.

Originally issued in September, 1942, Order L-142 was designed to limit the amount of steel used in the manufacture of metal doors, frames and shutters. The supply of the types of steel required is now adequate to meet anticipated requirements. Revocation of L-142 will save manufacturers' time in obtaining WPB's permission to manufacture and sell the items not specifically permitted by the order. Recently, most applications for such authorization have been granted because the products were needed for essential uses—as for example, pressed steel door frames in hospitals.

An estimated 41,000 tons of carbon steel or an equivalent amount of aluminum will be used for metal doors, frames, and shutters in 1945, as compared with 30,000 tons of steel allotted to the industry in 1944.

L-41 Interpretation

INTERPRETATION 11 to Conservation Order L-41 (Construction) has been issued to clarify provisions governing building alterations that may be made in connection with installations of machinery or equipment permitted under Direction 2 of the order.

The interpretation states that the alterations which can be made without WPB permission are only such as are directly required in connection with the installation or operation of the machinery or equipment being installed. Alterations not directly required in connection with the installation or operation may not be made under the Direction.

For example, new walls or partitions may be put in where required for the operation of the machinery or equipment, but the installation of offices, office partitions, storage rooms, toilets, etc., are not permitted except by specific WPB approval.

The interpretation further points out that the Direction does not limit the cost of building materials which may be used in connection with the installation of machinery or equipment to be used in a business designated on List A of Controlled Materials Plan Regulation No. 5; on Schedules I or II of CMP Regulation No. 5A; or in a business given priorities assistance by any P or U order for maintenance, repair or operating supplies. However, in the case of machinery or equipment to be used in any other business, the MRO symbol and an AA-5 rating may be used to get \$500 worth of materials for each installation or related alteration. The amount of unrated materials which may be obtained for such an installation is not limited by the Direction.

Processing or service machinery or equipment may be installed in an existing building regardless of how the equipment is obtained. However, building service equipment (plumbing, heating, lighting fixtures and the like) may only be installed when obtained by means of an approval on a special application form such as WPB-541 WPB-542, or WPB-1319. Building service equipment not obtained through approval of a special form may not be installed under Direction 2.

Plumbing and Heating equipment not included on List A of Limitation Order L-79 (Plumbing, Heating and Cooking Equipment) is normally obtained without any application to WPB and cannot, therefore, be installed under Direction 2 of Order L-41.

If plumbing and heating equipment included on List A of Order L-79 is to be installed in a residence, application may not be made on WPB-1319, but must be made on Form WPB-2896 (Application for Residential Construction Under Order L-41) and filed with the Federal Housing Administration. Approval of this housing application gives the applicant authority for the needed alterations or new construction.

Plumbing and heating equipment which cannot be obtained on a special form and therefore cannot be installed under Direction 2 may be installed to the extent permitted under the annual allowance given by Order L-41 or by other provisions of that order. If an installation is not permissible under L-41, an application under that order should be filed in the usual manner.

Lead Uses Curtailed

WPB announced December 27 that most civilian uses for lead will be restricted to the annual rate of 60 per cent of the 1944 level through a complete revision of Order M-38.

The recently announced critical supply position of lead, a result of mounting military demands, declining production and a dwindling Government stockpile, required this action, officials of the Tin, Lead and Zinc Division said.

Government officials reported that estimated 1945 requirements are 1,150,000 tons as compared with 970,000 tons of total supplies. Government reserves are less than one month's consumption and have been decreasing at a rate of from 15,000 tons to 25,000 tons per month during the last five months.

Restrictions and availability of lead are defined in the revised M-38 order under three new lists. List A outlines all prohibited uses (with certain minor exceptions). List B classified the end uses for storage batteries, cable covering, tetraethyl and ammunition for military use only, for which lead will be 100 per cent available. Lead will also be unrestricted for solders, bearing metals, brass and bronze. Under List C, which embraces the greater portion of civilian uses, lead is restricted in the first quarter of 1945 to 30 per cent of the amount used in the first half of 1944, or at a 60 per cent annual rate.

(Continued on Page 198)

The Residential Heating Market

Reproduced herewith are the charts presented by Chas. E. Price, AMERICAN ARTISAN, at the annual meeting of the National Warm Air Heating and Air Conditioning Association in Cleveland, December 13.

They hit the high-lights, in terms of national figures, of facts on the replacement and new home market for warm air heating. They set up one method of arriving at a post-war estimate of furnace sales and touch briefly on how statistics of this kind can be used in establishing quotas and in determining other business objectives.

Chart 1

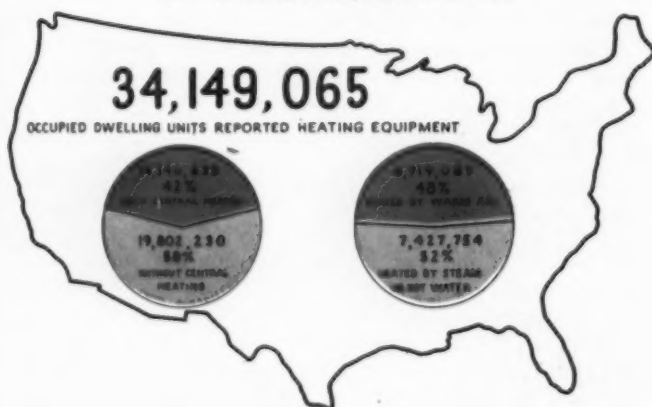
CHART 1 gives the general picture to be obtained from the U. S. Census of Housing, conducted in 1940 and the only complete count ever made of the heating methods employed by America's homes. It shows that 34,149,065 occupied dwelling units reported on their heating equipment. 42 per cent of them have central heating; 58 per cent are without central heating. 48 per cent are heated by warm air; 52 per cent are heated by steam or hot water.

These figures have been widely used and quoted to point out the size of the possible modernization market . . . close to 20,000,000 homes without central heating. They have been widely used and quoted to point out in the centrally heated homes, the proportion of warm air and radiator heat and, in view of the supposed dominance of warm air, have created some surprise that there are apparently more radiator heated homes . . . 7,427,000 . . . than there are warm air . . . 6,919,000.

Actually, what these figures are though are dwelling units and they are not heating installations

AMERICA'S HOMES AND HOW THEY ARE HEATED

U.S. Census of Housing-1940
BY TOTAL DWELLING UNITS



. . . they are not furnaces, not boilers. A dwelling unit is a single-family home or it is one apartment in, say, a 24-apartment building. If the latter, a single 24-apartment building or structure is counted here as 24 dwelling units and if the form of heat is steam or hot water they are 24 of this steam and hot water total.

Thus they are not countable as the number of furnaces or number of boilers that have been sold and

might be replaced; in short, they are not a measure of the size of either market in terms of equipment units . . . and those who have used them as such are "off" to the extent that they are not these things.

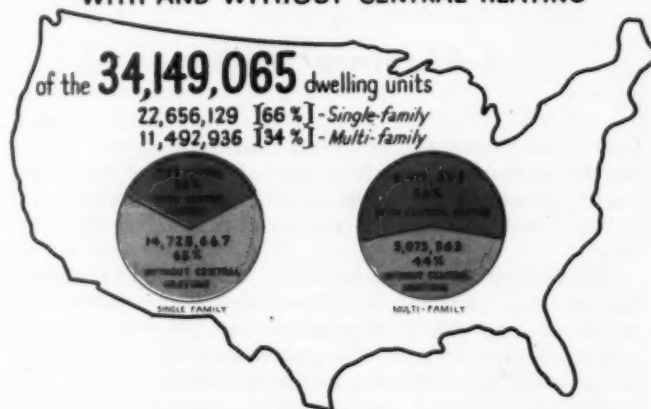
Chart 2

Chart 2 shows how these dwelling units break down.

Of the 34,000,000 dwelling units, 22½ million are in single-family structures (66 per cent) and 11½ million are in multi-family. And of the single-

AMERICA'S HOMES AND HOW THEY ARE HEATED

U.S. Census of Housing-1940
BY SINGLE-FAMILY AND MULTI-FAMILY STRUCTURES
WITH AND WITHOUT CENTRAL HEATING



family units . . . which are individual houses and can be counted as so many furnaces or so many boilers . . . only 35 per cent, or just under 8,000,000, have central heating, while 65 per cent are without central heating.

It will be noted that 56 per cent of the dwelling units in multi-family structures are centrally heated and how many boilers or furnaces that might represent is not a part of this presentation because the primary warm air market is the single-family home.

Chart 3

Chart 3 gets down to cases on that.

Of the centrally heated single-family dwelling units, or homes, 65 per cent are warm air and 35 per cent are steam and hot water. There are, as of 1940, at least 5,131,000 furnaces in America's single-family homes to 2,795,575 steam or hot water boilers, confirming the dominance of warm air, almost 2 to 1, in what we call the existing residential heating

AMERICA'S HOMES AND HOW THEY ARE HEATED

U.S. Census of Housing-1940

BY SINGLE-FAMILY AND MULTI-FAMILY STRUCTURES
TYPES OF HEATING



market and giving us an actual measure of replacement possibilities in each division of the market.

Only 28 per cent of the dwelling units in multi-family structures are heated by warm air, which is to be expected, and most of the 1,787,000 are undoubtedly in two-family structures.

These figures, incidentally, have never before been made available. They are not in the publicly-released Census data. AMERICAN ARTISAN had the Census Bureau make a special tabulation of this breakdown and it is available by states as well as by totals as shown here.

Again, this is the true picture of the residential heating market that can be measured and compared in terms of equipment units. It is now possible to see where and to what extent each type of heating system fits.

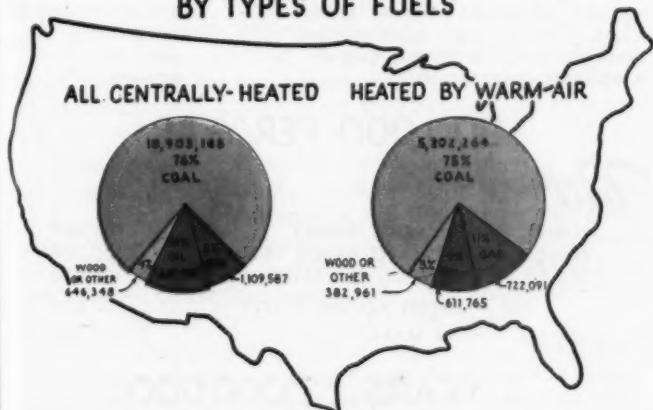
Chart 4

More to carry along the line of what is available for planning than to develop any particular point, Chart 4 shows how these dwelling units are heated by types of fuels. Of all centrally-heated units, including those heated by warm air and those heated by steam or hot water, 76 per cent are heated by coal,

AMERICA'S HOMES AND HOW THEY ARE HEATED

U.S. Census of Housing-1940

BY TYPES OF FUELS



8 per cent by gas, 12 per cent by oil and 4 per cent by wood or other.

Again the Census does not make available types of fuels by types of heating systems, but American Artisan has interpolated figures that were available in an attempt to correlate types of fuels with warm air and came out with this picture of how the warm air units are fired . . . 75 per cent coal, 11 per cent gas, 9 per cent oil and 5 per cent wood or other.

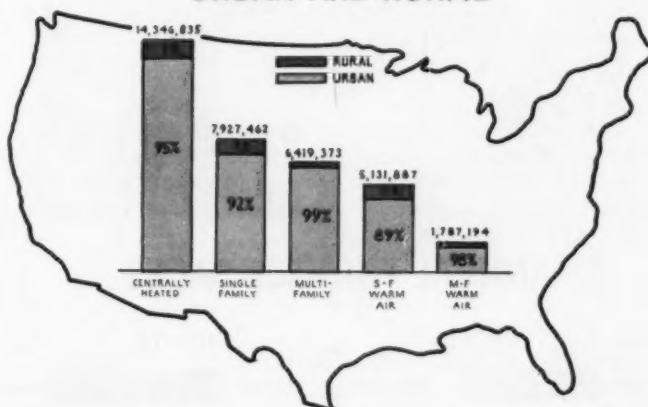
Chart 5

Many people talk about the farm market and Chart 5 provides a quick look at the breakdown of these heating figures into urban and rural markets. It will be seen that only 5 per cent of all the centrally

AMERICA'S HOMES AND HOW THEY ARE HEATED

U.S. Census of Housing-1940

URBAN AND RURAL



heated dwelling units are in the farm market, 8 per cent of the single-family and 1 per cent of the multi-family. However, the rural market is proportionately more important to warm air, as 11 per cent of the 5,131,000 single-family warm air heated homes are on farms and 2 per cent of the multi-family.

Chart 6

Another picture of the urban and rural markets compares warm air and steam or hot water in each.

AMERICA'S HOMES AND HOW THEY ARE HEATED

U.S. Census of Housing-1940

URBAN AND RURAL
WARM AIR AND STEAM OR HOT WATER



In the urban market, 63 per cent of the single-family centrally heated units are warm air; 37 per cent steam or hot water. In multi-family it is 28 per cent warm air in the urban market and 72 per cent steam or hot water. In the rural market, however, 80 per cent of the single-family centrally heated homes are warm air to 20 per cent steam or hot water, with the same proportion in multi-family. So, if it is important, warm air is relatively stronger in the rural market than it is in the urban, but it will be noted we are only talking about some 500,000-odd furnaces in the rural market to over 4½ million in the urban.

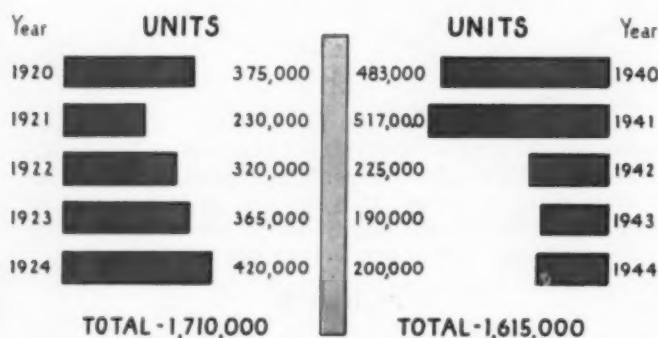
These few charts have presented a quick picture of how America's homes are heated and indicate that there are basic data available helpful in analyzing the industry's position and possibilities in the replacement and modernization market.

They are the basis for estimating, on the knowledge of what they show for 1940 and what has been sold since, that there are actually 6,500,000 warm air furnaces out around this country. And the question, of course, is how many can we replace in the first five post-war years?

Chart 7

Chart 7 shows one way of answering this question, by assuming the average life of a furnace to be 20 years and, therefore, the furnaces sold 20 years ago must be replaced now. This chart shows the num-

ANNUAL FURNACE SALES



REPLACEMENT DEFICIENCY

1940-1944

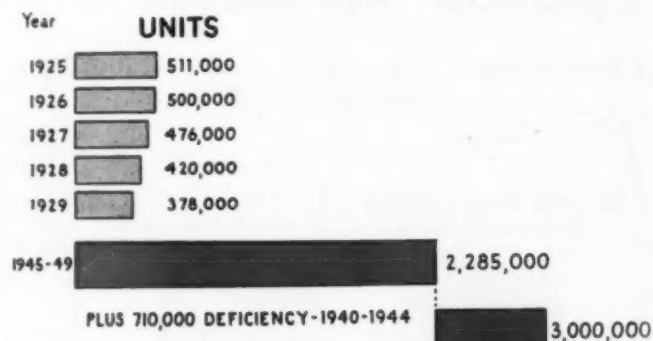
ber of furnaces sold in 1920, 1921, 1922, 1923 and 1924, and the number sold in 1940, 1941, 1942, 1943 and 1944—20 years later.

If our premise is correct, 1,710,000 furnaces sold in 1920-24 should have been replaced in 1940-44 and, obviously, many were, but of the 1,615,000 sold in these last five years at least 615,000 were for new homes, so only 1,000,000 of the needed 1,710,000 replacements were taken care of. This leaves a deficiency, or a replacement backlog, built up during these war years of 710,000 furnace units.

Chart 8

In the five years from 1925-1929, 2,285,000 furnaces were sold and if, in 1945-1949, they must be replaced we see what we have ahead of us. To that figure we add the deficiency we have suffered during

FURNACE REPLACEMENT NEEDS - 1945-1949



3,000,000 FURNACES SHOULD BE REPLACED IN FIRST FIVE POST-WAR YEARS!

the last five years and we come out with the round figure of 3,000,000 furnaces that should be replaced in the first five post-war years.

Incidentally, those first five post-war years might be 1946-1950, not 1945-1949; might even be later . . . but there is no getting around a need for at least this many furnaces and every year we delay, the accumulated back-log becomes greater.

Chart 9

Our other market is in the field of new construction and there is no question that there will be a great boom in residential building after the war. Chart 9 gives some of the estimates of authorities ranging from 820,000 to 1,300,000 units per year. If we take the middle road we can assume an average of 900,000 as what can be expected.

However, note that these estimates, too, are dwelling units, not single-family homes. That is the first deduction we must make to see what the new home market means to furnaces. At least 20 per cent will be in multi-family structures, so we have no stake in 180,000 of these predicted homes or dwelling units.

Then, it is pretty well agreed among experts that 25 per cent of these remaining homes will cost under \$3,000 and, rightly or wrongly, we will not consider

NEW CONSTRUCTION

POST-WAR ESTIMATES OF ANNUAL NEW DWELLING UNITS

AGENCY OR INDIVIDUAL	ANNUAL ESTIMATE
NATIONAL RESOURCES PLANNING BOARD	900,000 TO 1,200,000
MILES L. COLEMAN - 20TH CENTURY FUND	1,300,000
INTERNATIONAL STATISTICAL BUREAU	880,000
F. W. DODGE CORPORATION	820,000

900,000 PER YEAR

But

DEDUCT 20% FOR MULTI-FAMILY	180,000
DEDUCT 25% OF BALANCE UNDER 13,000	180,000
DEDUCT ESTIMATED NOT CENTRALLY HEATED	140,000
NOT A CENTRAL HEATING MARKET	500,000
CENTRAL HEATING MARKET	400,000

5 YEARS... 2,000,000

them as a furnace market. Then, for geographical, climate and other reasons, another 140,000 of these homes are probably not to be centrally heated, so the new home market for central heating does not average over 400,000 per year... in five years, 2,000,000.

What percentage of those can we hope or expect to sell warm air?

Chart 10

In the five pre-war years 2,162,943 furnaces and 887,238 steam or hot water boilers were sold. Seventy per cent, in other words, of the central heating plants sold were warm air. If we apply that to the

TOTAL UNIT SALES FIVE YEAR PRE-WAR PERIOD-1937-1941

WARM AIR FURNACES

2,162,943 70%

STEAM & HOT WATER BOILERS

887,238 30%

new home market ahead and add it to the replacement market, we have, as shown in Chart 11, for the

Chart 11

TOTAL UNIT SALES FIVE YEAR POST-WAR PERIOD

REPLACEMENT FURNACES 3,000,000

NEW CONSTRUCTION FURNACES 1,400,000

(70% OF 2,000,000 CENTRALLY-HEATED HOMES)

TOTAL 4,400,000

AVERAGE PER YEAR..... 880,000

five-year postwar period ahead the 3,000,000 replacement furnaces and, at 70 per cent of the 2,000,000 new centrally heated homes, 1,400,000 new construction furnaces... a total of 4,400,000... an average of 880,000 per year.

That is a lot of furnaces to an industry whose previous high has been slightly over 500,000 in a year... but it's a lower figure than some other analysts have arrived at and it is made up of a necessity rather than a desire demand for replacements and on the basis that warm air's competitive position with radiator heat remains as it has been.

If the warm air industry can encourage the homeowner to modernize and replace a furnace that could still function, if it can crack some of the 15,000,000

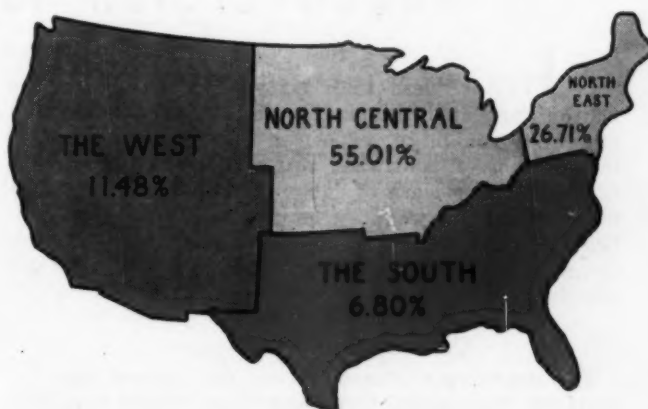
stove-heated homes, if it can improve its 70-30 position in the industry, it can go on beyond this estimate. On the other hand, if it loses its competitive preference and if automobiles, refrigerators and other conveniences get to the home owner's pocket-book and strip it first, it can discount these figures.

Chart 12

Chart 12 shows where warm air markets lie. Here is how existing furnaces are distributed by territories. These are broad areas, of course... 26.71 per cent of the furnaces in this country are in the

DISTRIBUTION OF WARM AIR FURNACES

PER CENT OF TOTAL INSTALLATIONS BY TERRITORIES



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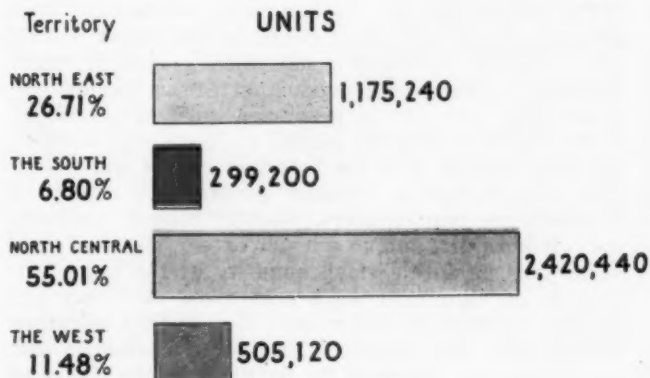
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So, if we sell 4,400,000 furnaces in the coming five-year period we are going to sell 1,175,240 of them in the North East, 299,200 of them in the South, 2,420,440 in the north central area and 505,120 in the west.

QUOTAS AND SALES- BY TERRITORIES

U.S. TOTAL-4,400,000 FURNACES..... 100 PER CENT



In the urban market, 63 per cent of the single-family centrally heated units are warm air; 37 per cent steam or hot water. In multi-family it is 28 per cent warm air in the urban market and 72 per cent steam or hot water. In the rural market, however, 80 per cent of the single-family centrally heated homes are warm air to 20 per cent steam or hot water, with the same proportion in multi-family. So, if it is important, warm air is relatively stronger in the rural market than it is in the urban, but it will be noted we are only talking about some 500,000-odd furnaces in the rural market to over 4½ million in the urban.

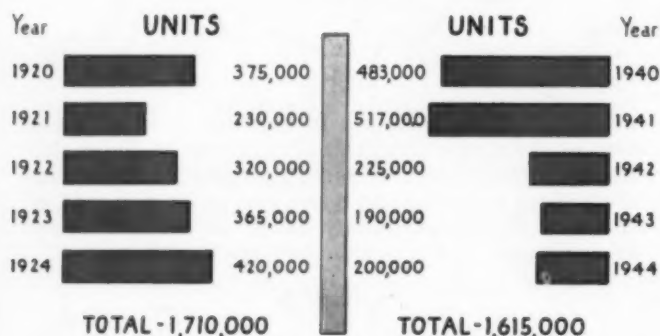
These few charts have presented a quick picture of how America's homes are heated and indicate that there are basic data available helpful in analyzing the industry's position and possibilities in the replacement and modernization market.

They are the basis for estimating, on the knowledge of what they show for 1940 and what has been sold since, that there are actually 6,500,000 warm air furnaces out around this country. And the question, of course, is how many can we replace in the first five post-war years?

Chart 7

Chart 7 shows one way of answering this question, by assuming the average life of a furnace to be 20 years and, therefore, the furnaces sold 20 years ago must be replaced now. This chart shows the num-

ANNUAL FURNACE SALES



REPLACEMENT DEFICIENCY

1940-1944

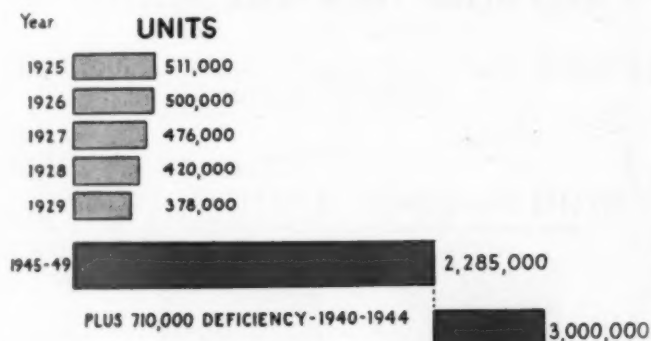
ber of furnaces sold in 1920, 1921, 1922, 1923 and 1924, and the number sold in 1940, 1941, 1942, 1943 and 1944—20 years later.

If our premise is correct, 1,710,000 furnaces sold in 1920-24 should have been replaced in 1940-44 and, obviously, many were, but of the 1,615,000 sold in these last five years at least 615,000 were for new homes, so only 1,000,000 of the needed 1,710,000 replacements were taken care of. This leaves a deficiency, or a replacement backlog, built up during these war years of 710,000 furnace units.

Chart 8

In the five years from 1925-1929, 2,285,000 furnaces were sold and if, in 1945-1949, they must be replaced we see what we have ahead of us. To that figure we add the deficiency we have suffered during

FURNACE REPLACEMENT NEEDS - 1945-1949



3,000,000 FURNACES SHOULD BE REPLACED IN FIRST FIVE POST-WAR YEARS!

the last five years and we come out with the round figure of 3,000,000 furnaces that should be replaced in the first five post-war years.

Incidentally, those first five post-war years might be 1946-1950, not 1945-1949; might even be later . . . but there is no getting around a need for at least this many furnaces and every year we delay, the accumulated back-log becomes greater.

Chart 9

Our other market is in the field of new construction and there is no question that there will be a great boom in residential building after the war. Chart 9 gives some of the estimates of authorities ranging from 820,000 to 1,300,000 units per year. If we take the middle road we can assume an average of 900,000 as what can be expected.

However, note that these estimates, too, are dwelling units, not single-family homes. That is the first deduction we must make to see what the new home market means to furnaces. At least 20 per cent will be in multi-family structures, so we have no stake in 180,000 of these predicted homes or dwelling units.

Then, it is pretty well agreed among experts that 25 per cent of these remaining homes will cost under \$3,000 and, rightly or wrongly, we will not consider

NEW CONSTRUCTION

POST-WAR ESTIMATES OF ANNUAL NEW DWELLING UNITS

AGENCY OR INDIVIDUAL	ANNUAL ESTIMATE
NATIONAL RESOURCES PLANNING BOARD	900,000 TO 1,200,000
MILES L. COLEMAN - 20TH CENTURY FUND	1,300,000
INTERNATIONAL STATISTICAL BUREAU	880,000
F.W. DODGE CORPORATION	820,000

900,000 PER YEAR

But

DEDUCT 20% FOR MULTI-FAMILY	180,000
DEDUCT 25% OF BALANCE UNDER \$3,000.	180,000
DEDUCT ESTIMATED NOT CENTRALLY HEATED	140,000
NOT A CENTRAL HEATING MARKET	500,000
CENTRAL HEATING MARKET	400,000

5 YEARS... 2,000,000

them as a furnace market. Then, for geographical, climate and other reasons, another 140,000 of these homes are probably not to be centrally heated, so the new home market for central heating does not average over 400,000 per year... in five years, 2,000,000. What percentage of those can we hope or expect to sell warm air?

Chart 10

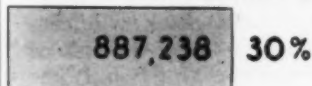
In the five pre-war years 2,162,943 furnaces and 887,238 steam or hot water boilers were sold. Seventy per cent, in other words, of the central heating plants sold were warm air. If we apply that to the

TOTAL UNIT SALES FIVE YEAR PRE-WAR PERIOD-1937-1941

WARM AIR FURNACES



STEAM & HOT WATER BOILERS



new home market ahead and add it to the replacement market, we have, as shown in Chart 11, for the

Chart 11

TOTAL UNIT SALES FIVE YEAR POST-WAR PERIOD

REPLACEMENT FURNACES 3,000,000

NEW CONSTRUCTION FURNACES 1,400,000

(70% OF 2,000,000 CENTRALLY-HEATED HOMES)

TOTAL 4,400,000

AVERAGE PER YEAR 880,000

five-year postwar period ahead the 3,000,000 replacement furnaces and, at 70 per cent of the 2,000,000 new centrally heated homes, 1,400,000 new construction furnaces . . . a total of 4,400,000 . . . an average of 880,000 per year.

That is a lot of furnaces to an industry whose previous high has been slightly over 500,000 in a year . . . but it's a lower figure than some other analysts have arrived at and it is made up of a necessity rather than a desire demand for replacements and on the basis that warm air's competitive position with radiator heat remains as it has been.

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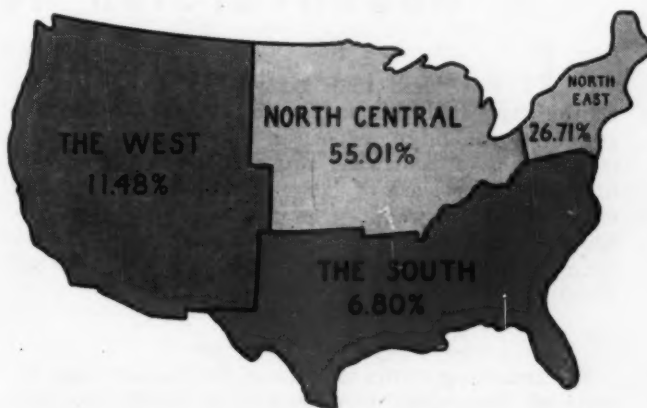
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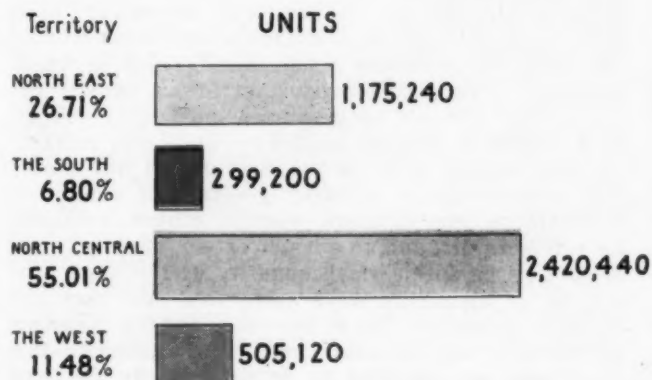
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QUOTAS AND SALES- BY TERRITORIES

U.S. TOTAL-4,400,000 FURNACES 100 PER CENT



Washington Letter



IT WAS less than sixty days ago when the Editor suggested this Letter for January might tell you what you might expect in the way of cut-backs, termination of contracts, prospective unemployment, the potential release of labor, and the problems that might beset the country as the result of these upheavals which were expected to follow the end of the German war, regarded as imminent before the Election.

The smashing contrast between the earnest expectations of those days, less than eight weeks ago, and the changes in fortune as they are reflected in our thought today, strikingly illustrate the shocking distance we have travelled in experience since early November. Later, in this Letter, there will be a short discussion of cut-backs and their allied problems in the sense the Editor had in mind; *the cut-backs we think of now, here, in Washington, mainly are the cut-backs in civilian industry.*

There is every reason to assume these cut-backs will be deeper and wider in the months ahead. Actually it seems reasonable to record that civilian production now is increasingly limited to those things and those quotas which are inescapable in order to keep the civilian economy and society functioning to support the war activities at home. Inventories will probably be replenished only to an extent that will prevent serious harm to the maintenance of the national economy.

In figures, "spot authorizations" sound assuring. However, when you study the statement issued by WPB on the last day of last year, discussing "spot authorizations," you learn electrical appliances will be produced "of necessity spasmodically and in small quantity." You learn production of mechanical refrigerators will not be permitted until after victory in Europe, and that the pitiful stockpile now remaining may be used only for the most urgent war needs. The same condition virtually governs the supply of domestic vacuum cleaners, electric ranges, domestic ice refrigerators, and, to a lesser extent, electric irons. WPB tells us only a small quantity of the huge production of aluminum ware authorized last year has reached the market. There have been sudden increases in military requirements; manpower, materials and machinery are expected to be used chiefly for war

production. Cast iron ware production is restrained by war work. Production of enameled ware is limited by lack of steel. Limited quantities of new gavanized ware, manufactured in 1944, may be expected to reach retail stores during 1945; *but galvanized sheets will be scarce and become scarcer this year.* The other day WPB announced waffle irons, stock kettles, grille and coffee makers for commercial use have been added to the list of items that may be manufactured. "But," remarked the announcement, "distribution will continue under control." The expansion of the list of civilian production appears encouraging; but the snapper is the statement that distribution will remain under control. In all likelihood most of the distribution will be diverted to direct or indirect war uses.

Superficial reading of many announcements leave the impression that considerable civilian production is permitted. Smaller War Plants Corporation made much of the statement that there is twice as much steel available today as civilian producers can use. SWPC did not, however, add that civilian producers cannot use the steel because civilian producers cannot obtain workers, and cannot obtain facilities except by jeopardizing their standing in the war economy. Justice Byrnes has made it possible for WMC to cite any offender against its manpower regulations before WPB; and WPB now is formally authorized to summon the offender before its Compliance Commission. If the Commission finds WMC regulations or orders have been ignored or disobeyed, the Commission may deprive the offender of all kinds of priorities, allocations, either granted or to be granted.

In other words, hereafter, those who are in bad grace with WMC or USES, may be deprived of their primary materials, of tools, of gasoline, fuel, certificates permitting the use of auto vehicles, of any and everything under control of the Federal Government which enables a plant or a business to function. We are told it is not very likely the power will be used, except in a handful of cases; the trouble is you never know who has the handful, and what may be in the hand. When Government once establishes the habit of using a power, the habit invariably grows.

Odd bits of information that crop up here and there appear to reveal that metals rapidly are growing scarcer. A discussion in WPB the other day

brought out that "military requirements for hot rolled steel sheets are expected to continue at a high level. Deliveries which required 45 to 60 days formerly, now require at least 90 to 120 days." Another official told us early in December that orders for cold rolled steel sheets cannot be scheduled before April, and that orders for hot rolled steel sheets cannot be scheduled before June. The same person stressed that aluminum is now obtainable only under CMP. It was only the other day former Vice Chairman of WPB, Charles Wilson, told us there was so much aluminum it was "running out of our ears." Just the day before New Year we were told it is imperative to channel the production of brass in 1945 for the small arms and artillery programs. All relaxations of limitation and conservation orders affecting brass have definitely been shelved. WPB also stressed that carbon steel scrap inventories have declined to such an extent during the last calendar year that military programs may be affected.

Toughest Time Lies Ahead

All the straws in the wind indicate that the toughest time in this war, at home, is still ahead. Inventories are shrinking, store shelves are getting still more bare, and very few factories are making items to replenish civilian goods. On the other hand, the needs of the armed services are increasing sharply. For example, the leather industry was advised recently it would have to provide a special supply of 9,000,000 pairs of army shoes during 1945. Leather already is scarce. Nine million pairs of army shoes are the equivalent of 30,000,000 pairs of civilian shoes. We are expected to provide huge quantities of leather to the "liberated" countries of Europe; and we are scheduled to send leather and shoes to Russia. Naturally, our supply of leather is not inexhaustible. The problem of making what is available cover all needs, has logically led those who make the plans to the conclusion that the present rationing of 3 pairs of shoes per year per person in America may have to be cut to a fraction over 1 pair of shoes per year. The reduction will be even more urgent if it becomes necessary for our military leaders to equip and train Belgian and French armies to help us fight the war in Europe. And the pressure will be still greater when and if the Russians join us in fighting the Japanese. It is generally accepted as inevitable that we must supply the equipment should the Russians come into the Pacific war. Whether we like it or not, there seems no doubt that we must largely provision and equip those who henceforth join us in the war.

Armed Forces Take Over

The long-cherished idea of V-E Day in Spring, or even next autumn, seems to be fading. Most of the cheery optimism, which led many to expect a quick victory last Fall, came from junior officers who had never been on the fighting fronts, and most of whom had never worn a uniform until they left their civil jobs and came to the Capital. It never has been quite clear to many sober and trained observers why the optimism of these military experts was permitted to dominate the imagination of the nation.

The core of hard-boiled professional military men, purely technicians of battle, never agreed with the happy warriors. The men who have made organized fighting their life-work have been utterly consistent. They have always believed we need a National Service Law; that factories and workers should be kept at the

job of producing until the enemy has actually quit; and that there is no place for a civilian economy in the new kind of total war except at a level just sufficient to keep the nation going; and that the leaders of the armed forces should have the ultimate decision in all questions that affect the war. Nor do these professional fighting men hold a war is won until it actually is won.

Gen. Marshall is unquestionably the greatest soldier in America. He is generally accepted by professional fighting men as the greatest military leader of our time. This is true even in the light of the recent reverses in Europe. You also find in Washington that Gen. Brehon V. Somervell usually is regarded as the great organizer of supply. But among Army men you often hear that the real inspiration for the remarkable organization of our supply lines comes from an obscure Colonel at General Headquarters. You hear that when things get into a snarl and one of the glittering brass hats needs guidance and counsel, he goes to this Colonel. Apparently the military folk on the inside feel this Colonel, whose name no one seems to know, has that utter consistency of thought, purpose and principle, which has unswervingly been reflected in the policy of the Army in relation to production and manpower at home. The Colonel seeks battle line service, but the legend is that the Generals at home will not let him go. He must be a West Pointer, because anonymity is one of the fundamental instincts they breed into a soldier at the Point.

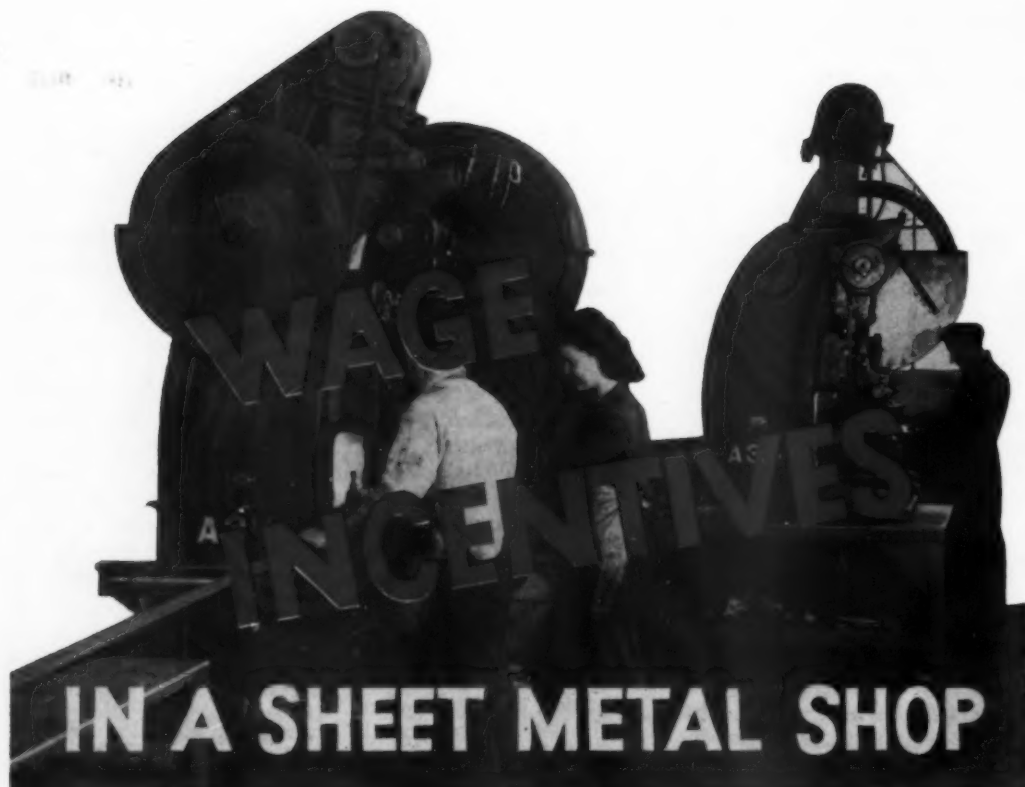
VE—Likely in 1946

Among the long-headed professional soldiers the current thought is that 1946 is the more likely year for the end of the European war. They think we must do it on our own, possibly with the help of the French and Belgians; and that it will take from 9 months to a year to train this potential European manpower. They have come to the conclusion that neither airpower nor brilliant maneuvers can win the war. Manpower, infantry, is regarded as the final solution to the war. Apparently the German offensive has been more effective than we have been told. As usual there is probably far more pessimism afloat in the Capital than the actual results warrant. David Lawrence, one of the soberest observers, with the best sources of information, has made the public comment that the German counter-offensive was "a solar plexus blow to our offensive strength," and, the Germans mean to keep the strategic offensive the rest of the winter. This means it will take us a good part of the summer to mount a big counter-offensive."

VJ—Not Even Forecast

The developments in Europe make a difference in the Pacific. This reporter has heard Government observers at semi-public dinners assert that it will not be as easy to re-take the Philippines as the casual reading of our despatches imply. It was an Assistant Secretary of the Navy who warned a gathering of editors that we are still on the outer periphery, and that it will take time and fighting to get to the heart of Japan, where we will have to fight 80,000,000 men, women, and children, ready to die. The impression here appears to be that the fight will be taken into Japan itself either in 1946 or 1947. And it was a young General who had just returned from the Far East who suggested we might still have to fight Japan in its empire on the Asiatic continent. This means

(Continued on page 227)



By
W. P. Jones

The
Overly-Hautz Co.,
Cleveland

Two of the company's larger punch presses. Man in rear is doing punching operation mentioned in text.

ABOUT one year ago our company, at the request of its factory employees, decided to install a wage incentive system. Professional "management engineers" were engaged to set up the framework of the system. I was selected to work with them while the system was being put in and to administer the system after its installation, not because I had any special qualifications, but only because my work as an estimator-salesman had enabled me to familiarize myself in a general way with our products and our manufacturing procedures.

Since that time many of our business friends have evinced an interest in wage incentives and have questioned me about the details of our system. There are many excellent books available dealing with time and motion study, but most of these are concerned only with straight-line mass production, very few of them with the problems encountered in a shop which is constantly manufacturing a wide diversity of parts in job lots. This article is written with a view to answering some of these questions and in the spirit of appraisal rather than criticism, to bring out some of the difficulties inherent in incentive systems.

Two Basic Systems

A few words dealing with the theory of two basic systems of incentive pay are needed.

One "system" measures the output of each individual worker and pays individual bonuses. Our system is one of this type called the "standard hour" plan. In brief, this consists of setting a standard time on each operation or on every part made, then comparing the actual time spent in doing the job with this "standard time." A bonus is paid to the worker when his clock time is less than this "standard time." The worker is guaranteed his minimum hourly rate regardless of whether or not he can beat the standard.

As you can readily see, it is quite similar to the old

"piece work" system except for this guarantee to the worker of his minimum hourly rate. In spite of anything you may have heard to the contrary, such a system increases the amount of clerical work to be done and usually necessitates hiring extra help. Also, it requires the procedure on each job to be written down step by step in advance of the actual run of the job, and determination of the correct methods is oftentimes a sizable task. In many firms, of course, this function is performed by the planning department as an efficiency measure regardless of whether there is a bonus system.

The other fundamental type of system, the "group plan," does not attempt to set standards on each phase of the job, but merely sets up a production standard for an entire factory or department and pays bonuses to all the workers when these standards are exceeded. My own experience with group plans is extremely limited, but to me they seem to have one fault, which is that they lead to a "let George do it" attitude on the part of the workers, and after the novelty wears off, production tends to drift back to its former level. Group plans have many applications, however, where other types are not satisfactory.

"Representative Job" System

Where individual incentives are employed in the mass production industries, it is often the practice on new work to manufacture some pieces before the standards are set and to time study each operation while it is actually being performed. But in many job shops there is not sufficient volume of any single piece to justify this procedure because the sheer complexity and diversity of new work would make it impractical to time study every operation on every new job without having a huge staff of time study men. Some means must be found to establish a standard time on a job before the job is started.

The usual solution to this problem is to make time

studies of representative jobs and to tabulate the information garnered from the time studies in such a way that rates for new jobs may be made up from this information without making further time studies. Of course, this method sacrifices some degree of accuracy, but the error should not be so great as to interfere with its practical application. Much of the success of the process is dependent upon the first step, that of making the time studies to be used as the basis for the future standards. More detailed instructions on time study than can possibly be given here are available in the library—particularly recommended are pages 255 to 267 inclusive of Ralph M. Barnes' "Motion and Time Study."

Making a Typical Time Study

"Micro-motion studies" are seldom required in a job shop; the familiar stop watch and observation sheet method is usually satisfactory. In as few words as possible, the technique of making a time study is this: The time study man observes the operation being studied as many times as are necessary for him to get each small element clearly in mind. He then writes down each of these elements in their proper order, leaving a line open between each element for noting possible delays. This is done on a special time study observation sheet which is ruled especially for the purpose. He does not attempt to stop and start his watch for each element but lets it run continuously and records the time shown on the face of the watch at the completion of each element. When delays occur, he notes them and times the delays also.

After the reading has been completed, he subtracts from each element shown the reading shown for the element just preceding it, thus deriving the elapsed time for each element. Several pieces should always be timed, and it is desirable also to time several operators on each operation. Elements where delays occurred or elements which seem out of line when compared to corresponding elements on other pieces are discarded. The elements for the different pieces

Form 120 OPERATION TIME AND PRODUCTION TICKET D-2-3					
OPERATION PUNCH 1/4" x 2" R.C. SLOTS			Date 12-7	Job No. B-1287	
Operator's Name R. WILLIAMS				Clock No. 110	
Helper's Name _____				Clock No. _____	
Man Hours Allotted To Job 2.0	Man Hours 2.2	Day Work Hours .2	STOP: OILING	DEC 7 13 13	
			START:	DEC 7 11 38	
			Elapsed Time	1.8	
Pieces Required 800	Pieces Completed 800	Upon Completion Move To BRAKE #34			
Part No. B-219607			Part Description CROSS WEB		
Material To Be Used # 10 x 11-3/32 x 9-7/64					

An individual time ticket for one operation. Note job was done in less than allotted time.

are averaged out, and each element is thus reduced to the "synthetic" time which represents the minimum time in which it is possible to do each element. To this minimum time must be added allowances for personal care, fatigue, machine servicing, and an allowance to give the worker an opportunity to make a bonus. These allowances are usually expressed in percentages and, of course, will vary considerably for different industries and different types of work, with the exception of the personal care factor, which is usually figured at 5 per cent.

Break Study into Small Elements

The breaking down of the time study into small elements is desirable because it gives a more complete and detailed picture of the operation than mere overall timing and because these small elements are to the standard setter what bricks are to a bricklayer. If each small element that normally enters into a general operation can be accurately timed and conveniently tabulated for future reference, then it should be possible to analyze a job and to build up a standard time on it just as our bricklayer builds a wall.

As you probably suspect, this plan looks good on paper but presents many problems in practice. It is usually advisable, therefore, to engage trained men who make a profession of setting up incentive systems to do the preliminary time study and rate setting and let them train members of your organization to carry on the operation of the system after it is installed. There are many good "management engineers," but there are also many poor ones, and it would be well to check thoroughly before signing any contracts. In any case, it is essential that at least one member of your organization be thoroughly conversant with time study and standard setting so that the shop standards may keep pace with the changes in products and processes which are constantly occurring in almost every factory.

The most vital requirement for this man is that he must know, or at least be able to find out, *exactly* to the smallest detail how each part is to be manufactured. He should be able to get along with everyone, and he should not be the type who throws up his hands in despair when errors and mixups occur, as they undoubtedly will. In short, he should have the wisdom of Solomon, the tact of a born diplomat, and the patience of Job.

DESCRIPTION OF TASKS		CLASS NO.	SHIFT NAME	SHIFT NUMBER
WHISTLER SET UP			PUNCHING	
SEAT BRCKT.		CC-749	NIAGARA A-34	127
4 HOLES 7/16" DIAM.		4	F. ZUKER	27
ALLOWANCES (PER CENT OF BASE SYNTHETIC TIME)		PRODUCTION ANALYST		
TOTAL		BASIC RATE		
UNIT OPERATIONS		UNIT OF TIME		TIME
1	2	3	4	5
PICK UP & INSERT	06	80	114	40
BLANK	04	80	07	07
PUNCH FIRST GROUP	04	86	122	53
OF FOUR HOLES	06	06	05	05
REVERSE BLANK	20	54	128	38
	06	10	06	06
PUNCH SECOND GROUP	20	68	130	30
OF FOUR HOLES	06	07	03	06
LAY ASIDE	30	70	137	25
	04	05	04	05
TOTAL				24
TOTAL TIME		CALCULATED		AVERAGE
24.5		1.66		5
TIME ALLOWED		NO. OF PIECES PRODUCED		OVERALL TIME PER PIECE
1.66		5		33
CALCULATION		STANDARD TIME PER PIECE (O.A.E.)		36
29 MIN.		STANDARD TIME PER 100 UNITS (O.A.E.)		360
5		STANDARD PRODUCTION PER HOUR		166
5				
5				
INC. 10%				
TOTAL 25.3				
07				
36				
100				

Time study sheet for a simple operation. Text explains how the rate is established by actual observation and timing.

page 2 of 2 pages		Tank 3307309 - 100 pcs. B-1267		
OPERATION DETAIL SHEET		JOB NO.		
Seq.	Operations on Standard Sizes given are Approximate - Do Not Use to Cut	Total Hrs. For Lot	Man Hrs. Per Pc.	Pcs. Per Man Hr.
9.	Notch corners of tank ends - 8 hits		.0112	90
10.	Form ends, four places		.0116	86
11.	punch two holes 3/4" diameter in bars		.0030	333
12.	Spotweld seam strip into tank		.0030	33
13.	Tack weld end pcs. in place		.1000	10
14.	Weld in end pcs. and weld seam		.3407	2.9

Typical Operation Detail Sheet. Man hours per piece (.0112) was calculated from a set of standards formulated by timing. .0112 is the decimal part of an hour (1) required to do one piece. The reciprocal of this (90) is the number of pieces required per hour.

One of the questions most frequently asked is, "What about the attitude of the men on incentive systems? Is it difficult to sell the idea to them?" In our own case the men asked for the system after seeing what it did for wage earners of one of our nearest competitors. Consequently, we did not have any job of selling to do at all.

Rate Must Insure "Bonus"

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Before setting standards on a job it is well to consider whether your present method of doing the job is the best one. One thing to look for when studying a job is the workman's method of handling each individual piece as he processes it. Intentionally or unintentionally workmen often do much unnecessary handling. Many times I have seen a man on a forming press, for instance, work from a lift platform of stock eight or ten feet from his machine and actually spend more time walking to and from the skid load of material than was spent in doing all the rest of the operation. The remedy here, obviously, was to move the platform up close to his machine. Incidentally, we have found it advisable to have one man or group of men work full time doing nothing but move material through the shop from one operation to another.

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welding required and yet on which distortion and warpage had to be held to an absolute minimum. In all there were eight separate welding operations required. Several of these eight operations had to be performed while the part was held rigidly in a heavy jig. Our method on this was to use two welders working simultaneously and one other worker whose function it was to set the work in the jigs and remove it for the welders. Each single piece was run through individually, and a second piece was not started until all operations had been completed on the first piece. Our primary concern had been for accuracy, yet we thought we had as an efficient handling procedure as could be devised. Time studies were made and the rates were set on the basis of this procedure.

Shortly after the rates went into effect one of the welders found ways of combining certain operations and eliminating much of the handling. Instead of doing the pieces singly, he found that savings in time could be effected by running the parts in groups of four or five pieces. Simply by eliminating lost motion he greatly reduced the total time required on each piece, and on some operations reduced it by as much as 50 per cent. Needless to say, he thereby earned substantial bonuses for himself. In this case it is debatable whether we are justified in calling it a change of method and reducing the rate. However, we let the rate stand as we are now getting a faster production than formerly at no increase in cost over the former method.

Satisfactory setting of rates for welding is a tough nut to crack. Welding rates vary according to the type of material the welding process used and the position of the work (vertical, overhead or down-hand). Knowing these factors and knowing the rate at which the material is fused, it is possible to find the time required actually to make the weld. In ordinary electric arc welding this is referred to as the

"arc time." To this "arc time," time required to prepare, position, fit, clamp and otherwise handle the work must be added. Welding problems are so diversified and so technical in their nature that it is impossible to make any generalized statements on setting up welding standards. Every shop has a different set of conditions. Readers interested in this problem can find much useful data in the *Welding Handbook* of the American Welding Society, Chapter 35 of which is devoted to this very subject, and includes some tables which will be useful to anyone attempting to set up welding standards.

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(Continued on page 225)



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page 2 of 2 pages OPERATION DETAIL SHEET		Tank 3307309 - 100 pcs. 8-1287		
JOB NO.				
Seq.	Operations on Standard Sizes given are Approximate - Do Not Use to Cut	Total Hrs. For Lot	Man Hrs. Per Pc.	Pcs. Per Man Hr.
9.	Notch corners of tank ends - 8 hits		.0112	90
10.	Form ends, four places		.0116	86
11.	punch two holes 3/4" diameter in bars		.0030	333
12.	Spotweld seam strip into tank		.0030	33
13.	Tack weld end pos. in place		.1000	10
14.	Weld in end pos. and weld seam		.3407	2.9

Typical Operation Detail Sheet. Man hours per piece (.0112) was calculated from a set of standards formulated by timing. .0112 is the decimal part of an hour (1) required to do one piece. The reciprocal of this (90) is the number of pieces required per hour.

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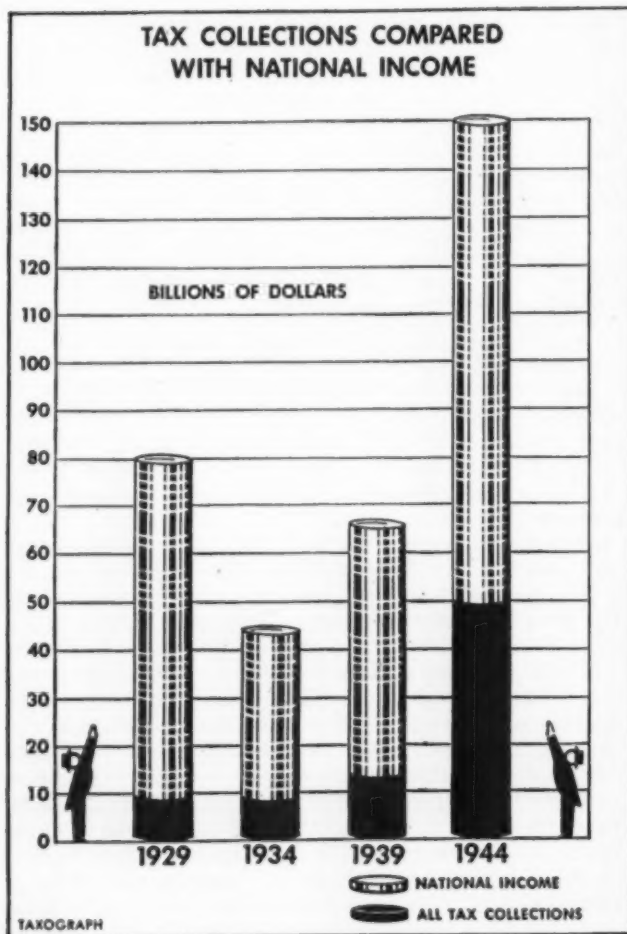
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FOR every American business man and citizen the pressing problem after the war will be ways and means to maintain a high level of employment. To insure full employment it will be necessary to overhaul, as quickly as possible, our tax structure. Many plans to this end have been proposed and much research has already been started. Early in 1943 the Research Committee of the Committee for Economic Development authorized a group of research studies; from this research has come one suggested tax plan which is presented in the following outline, together with two other suggested plans which merit consideration.

The following phases of the problem are outlined by the CED:

"Taxes, postwar, can be reduced, but they will be heavy by prewar standards. Federal governmental expenditures will be far greater than in peacetime. The main items can be foreseen. Interest on the Federal debt alone will be equal to our prewar total annual tax collections. We will have to support an army, navy and air force many times larger than prewar. We must provide benefits to millions of World War II veterans. We must prepare for new international obligations. There will probably be increased social security costs. The peacetime costs of the Federal government will be as much or more than before the war.

"After the war total Federal expenditures will

**Reprinted from Tax Front, Sept., '44.*

How Can Our Expected Heavy Post-war Taxes Be Raised?

Here Are Three Post-war Tax Plans*

likely be between 16 and 18 billions of dollars a year, not including social security payments and retirement of debt. This is $2\frac{1}{2}$ to 3 times the highest revenue raised in any single year before the war. These figures mean that after the war the average cost of supporting the activities of the Federal government, if spread evenly over the entire population, will be more than \$500 a year for a family of four. There will be, in addition, some 12 billions of dollars collected each year by state and local governments."

These colossal sums needed must and can be raised by taxation. The question for every business man is: How can they best be raised? The three suggested plans summarized following are means to that end.

ESTIMATES OF POSTWAR REVENUES UNDER PROPOSED PLANS (In Millions)

	Twin Cities Plan	Ruml- Sonne for Economic Plan Development†	Plan of Committee
Corporation Income Tax..	\$ 5,000	\$ 1,000	\$ 2,100
Individual Income Tax..	5,000	13,000	10,900
Estate and Gift Taxes...	500	500	900
Customs	400	400*	800
Excise Taxes	4,000	3,000	2,000
General Sales Tax	2,800		
Miscellaneous Revenues .	300	100*	400
Total	\$18,000	\$18,000	\$18,000

* The Committee lumps "Tariff and Miscellaneous" into a single item of \$500 million.

† This is taking the median of three sets of estimates offered by the Committee, and eliminating an allowance of \$400 million for disposal of government plants and supplies.

Plan Of The Committee For Economic Development

Objective

"A high level of production and employment."

General Tax Thesis

(1) Least possible restrictions upon an expansion of production and employment. Personal income taxation "has less of a repressive effect upon production and employment than do sales and excise taxes and the taxation of corporate profits." (2) Taxes should rise progressively "with ability to pay." (3) Taxation should be adequate to provide for current expenditures, guarantee the integrity of the public debt, and insure the soundness of the dollar.

Statistical Premises

National income of \$140 billion; volume of employment, 7 to 10 million more jobs than in 1940; federal expenditures of 16 or 18 billion.

Provisions of Plan

1. Repeal

Excess profits, capital stock, and declared value—excess profits taxes.

2. Corporation Income Tax

Rates—Single flat rate, same as that proposed for normal individual rate, namely, 16 to 20 per cent; losses—to be carried forward for six-year period; double taxation of dividends—to be avoided by "crediting the individual stockholder with the corporate tax which has been paid in his behalf."

3. Individual Income Tax

Exemptions—\$500 for taxpayer and each dependent. Rates—On lowest bracket of taxable income, single standard rate of 16 to 20 per cent.

Graduated rates should rise to maximum rate of 73 to 77 per cent.

4. Capital Gains

Ultimately capital gains should be fully taxable as other income, with full deduction of capital losses.

5. Excise Taxes

Retain only liquor and tobacco taxes, "perhaps on gasoline, if needed."

6. Estate and Gift Taxes

These taxes "are less likely to have a depressing effect on incentives to enterprise than the collection of equal amounts from business men during their lifetime." Should place "more emphasis" on these taxes, although, by closing present avenues of evasion, it may be possible to moderate present steeply graduated rates.

7. Tariff

Substantially increased revenues could be obtained by reducing "the present prohibitively high structure of tariff rates."

8. Tax Exemption

On all future issues of government securities should be abolished.

9. Social Security Taxes

"Doubt the validity" of the theory of building up substantial reserves.

10. Debt Policy

"As much debt should then be retired as is consistent with maintaining high levels of employment and production."

The Ruml-Sonne Plan

Objective

"Maintenance of continuing high employment under private enterprise."

Economic Philosophy

"A wise fiscal monetary policy . . . can minimize, if not prevent, panic and mass unemployment." Federal action "through budgetary operations when requisite to maintain adequate, effective demand, and thereby to contribute to the attaining of high employment."

General Tax Thesis

(1) Taxation should be heavy enough to "balance expenditures at some agreed level of high employment and high production." (2) Business management should be freed from the necessity of shaping business policies according to "federal income tax considerations."

Statistical Premises

Postwar national income of \$140 billion, derived by

estimating the required volume of postwar employment, at approximately 55 million jobs; then computing income that would be produced at that volume of employment.

Postwar Federal Expenditure:

Miscellaneous	\$1.5 billion
Interest	5.5
Military and naval	5.0
Veterans	2.0
Agriculture	1.0
All other government expenses	2.0
Foreign loans	1.0
Total	\$18.0

Provisions of Plan

1. Corporate Income Tax

All corporate income and profits taxes abolished except (a) a 5 per cent franchise tax; (b) application of the same normal rate as that of indi-

viduals, namely, 16 per cent, on undistributed earnings, "which might or might not be credited to individuals when disbursed."

2. Individual Income Tax

Exemptions—\$500 for taxpayer and each dependent.

Rates—Normal	16 per cent
Surtax	0-50 per cent
Maximum	66 per cent

3. Capital Gains

As at present, with maximum rate of 25 per cent on long term gains.

4. Estate and Gift Taxes

Present rates.

5. Excises

Retain only alcohol and tobacco taxes at 1943

rates; gasoline tax if needed.

6. Tariff

"Gradual reduction of tariffs and freer trade as higher levels of employment are reached."

7. Social Security Taxes

(a) Old-age insurance should be financed on a current basis; (b) unemployment insurance program should be compensatory, building reserves only in periods of "excess employment."

8. No General Sales Tax

9. Abolition of Tax-exemption

On all future issues of federal, state and municipal securities.

10. Debt Policy

Retire principal only when production and employment exceed "agreed level."

The Twin Cities Plan

Objective

"A tax system that will stimulate high levels of production and consumption" and in particular will encourage "venture capital."

General Tax Thesis

"Heavy corporate income tax rates are not as harmful to the private enterprise system as are heavy individual income tax rates."

Statistical Premises

Postwar national income of \$120 billion, an estimate derived by computing size of national income necessary to provide full employment.

Postwar Federal Expenditure:*

Ordinary expenses (including farm benefits, veterans' pensions and benefits	\$5.5 billion
Interest	5.5
Military (two million men in armed forces)	5.5
Public works	1.5
Total	\$18.0

Postwar Available Revenue Resources:

Miscellaneous revenues	\$300 million
Customs	400
Estate and gift taxes	500
Excise taxes	4000
Total	\$5200

Leaving \$12.8 billion to be raised from other sources, namely, income and sales taxes.

*The figures here cited represent the median between two estimates, maximum and minimum, offered.

Provisions of Plan

1. Repeal the capital stock, excess profits, and declared value

Excess profits taxes, 2 per cent penalty on consolidated returns, and requirement for inclusion of 15 per cent of domestic corporation dividends

in gross income.

2. Corporate Income Tax

Rates for corporations with not over \$50,000 net income.....15-40 per cent
For corporations with net income over \$50,000 40 per cent
Net operating losses to be carried forward for five years.
40 per cent of domestic corporation dividends received to be excluded from individual's gross income.

3. Individual Income Tax

Exemptions—Single \$600, married \$1400, dependents \$400.
Rates—Normal 10 per cent
Surtax 6-50 per cent
Maximum rate 60 per cent
Administration—Extend and improve the withholding provision.

4. Capital Gains and Losses

Assets held for six months or less not construed to be capital assets.
Corporations to take into account 100 per cent of capital gains and losses, individuals 50 per cent. Individuals taxed at regular income tax rate or, at option of the taxpayer, at 25 per cent. Corporations taxed at 12½ per cent.

5. Estate and Gift Taxes

As at present.

6. Excise Taxes

Present taxes continued, at 1943 rates.

7. Retail Sales Tax

Rate 5 per cent, with no exemptions.

8. Debt Policy

Retire debt only when national income exceeds \$120 billion.

Significant Similarities And Differences

1. There is general agreement in the estimates of postwar national income and the level of revenue requirements.
2. There is unanimous agreement that the general objective of any postwar system of taxation should be to encourage expanding production and employment.
3. The Twin Cities group differs from both other groups, however, in its theory of the relation of taxes to business incentive, holding that corporation income taxes have less repressive effects than high rates on the higher brackets of individual income. Both other groups hold that individual income taxes have less repressive effects upon business than corporation and excise taxes.
4. In accordance with this difference, the Twin Cities Plan places 28 per cent of the tax burden in the form of a corporation income tax, while in the Ruml Plan the corporation income tax represents 5½ per cent, in the C. E. D. Plan 11½ per cent, of the total tax burden, as measured by the revenue estimates under the three plans. If excise taxes are construed to be business taxes, the Twin Cities Plan places 50 per cent of the tax burden upon business. By the same measure, the Ruml Plan places 22 per cent of the burden on business, and the Plan of the Committee for Economic Development 28 per cent.
5. The Twin Cities Plan taxes consumers in the form of a general retail sales tax and to whatever extent the present excise taxes may be construed to represent taxation of consumers. Both the

- Ruml Plan and the Plan of the Committee for Economic Development reduce the present excise taxes and oppose any general sales tax.
6. Both the Ruml Plan and the C. E. D. Plan adhere unflinchingly to the ability theory of taxation, the former carrying individual income tax rates up to 66 per cent, the latter up to 73 per cent. The Ruml Plan places approximately 72 per cent of the total tax burden upon individual incomes, the C. E. D. Plan 60½ per cent.
7. Both the Ruml and the C. E. D. groups favor a reduction of tariff rates, the former anticipating no material effect upon revenues, the latter anticipating a substantial increase in customs revenues.
8. There is general agreement among the three plans that the principal of the public debt should be reduced only in periods of high production and employment, the Committee for Economic Development perhaps being slightly more emphatic in stating that "as much debt should then be retired as is consistent with maintaining high levels of production and employment."
9. The Ruml-Sonne Plan is unique (a) in its proposal that ultimately capital gains and losses should be treated in the same way as other income; and (b) in its suggestion for a tax on the undistributed profits of corporations.
10. In general, it may be said that the Twin Cities Plan puts the bulk of the tax burden on business and consumers; the C. E. D. Plan on business and on personal incomes; the Ruml Plan on personal incomes.

	THE TWIN CITIES PLAN	THE RUML-SONNE PLAN	PLAN OF THE COMMITTEE FOR ECONOMIC DEVELOPMENT
Capital Stock and Excess Profits Taxes	Repeal	Repeal	Repeal
Corporation Income Tax	Rate (income over \$50,000) 40% Losses carried forward 5 years 40% of dividends received to be excluded from individual's gross income	Franchise tax at 5% 16% on undistributed earnings, which "might be credited to individuals when disbursed"	Rate: single flat rate of 16 to 20% Losses carried forward for 6 years Double taxation of dividends avoided by crediting individual stockholder with corporate taxes paid
Individual Income Tax	Exemptions: single \$600, married \$1400, dependents \$400 Rates: normal 10% + surtax 6—50%	Exemption: \$500 for taxpayer and each dependent Rates: normal 16% + surtax 0—50%	Exemption: \$500 for taxpayer and each dependent Rates: 16 to 73%
Capital Gains and Losses	Corporations to take into account 100% of capital gains and losses; individuals 50% Individuals taxed at regular income tax rate, or optional rate of 25% Corporations taxed at 12½% Property held less than 6 months not construed to be "capital assets"	As at present, with maximum rate of 25% on long term gains	Ultimately should be taxed just as other income
Estate and Gift Taxes	As at present	Present rates	As at present, but should have "more emphasis"
Excise Taxes	Present taxes retained at 1943 rates	Repeal all except liquor and tobacco, retaining gasoline, if needed	Repeal all except liquor and tobacco, retaining gasoline, if needed
Sales Tax	General retail sales tax at 5%	None	None
Tariff	No recommendation	Gradual reduction	Reduce present high structure of tariff rates
Debt Policy	Retire principal only when national income exceeds \$120 billion	Retire principal only when production and employment exceed "agreed level"	Retire principal as rapidly as is "consistent with maintaining high levels of employment and production"
Tax Exemption of Government Securities		Abolish on all future issues	Abolish on all future issues

TAX CALENDAR

Prepare a Tax Calendar similar to this covering Federal, state and local laws. The dates on which Federal returns and taxes are due are the same for all states, but these dates differ on state and local taxes so get the correct information for your state and locality and make proper listings.

Jan. 1—New withholding exemption (Form W-4) becomes effective and new schedule of withholding taxes becomes effective. The last day for employees to furnish employers with new withholding exemption certificate was December 1, 1944.

Jan. 10—Deposit tax withheld in previous month, if more than \$100, in a depository authorized by the Secretary of the Treasury. If monthly withholdings are less than \$100, employers are not required to use Government depositories, but may find it desirable to do so.

Jan. 15—Final opportunity for amending 1944 estimated income tax.
Pay final installment of 1944 estimated income tax. A final income tax return filed and paid on or before January 15, 1945, will serve instead of the January 15 estimated income tax return.

Jan. 20—File sales and compensating use tax to city.

Jan. 31—Give each employe original and duplicate copy of Form W-2 (revised) showing total wages paid and amount of income tax withheld from his wages. Retain third copy (Form W-2a) to be filed for 1944 with reconciliation form W-3 and Form W-1.

Make quarterly return covering deductions from wages for last quarter of 1944 on Form W-1. Use pre-addressed form supplied by the Collector. If blank form, not pre-addressed is used, show your name exactly as on previous returns. Pay by check, money order, cash or depository slips.

Reconcile on Form W-3 the totals of withholdings on Form W-2 with totals on quarterly returns for 1944 made on Form W-1. Furnish a list in the form of an adding machine tape, or handwritten list, showing every item of tax withheld as listed on withholding receipts. If you gave employees statements of income tax withheld from wages on the old style form W-2 during 1944, submit duplicate copies with quarterly return or the last quarter due on or before January 31, 1945.

These old receipts would have been given employees on termination of work during 1944 before the new forms were authorized. Such receipts must be given employees not later than 30 days after the last payment of wages.

Make quarterly return under Federal Insurance Contributions Act on Form SS 1-a.

Make quarterly return to state for unemployment compensation.

Make annual return for preceding year on Form 940 under Federal Unemployment Tax Act.

Feb. 10—Deposit January withholdings in depository if more than \$100.

Mar. 10—Deposit February withholdings in depository if more than \$100.

Mar. 15—File final Federal income tax return for 1944. File first estimate of 1945 income tax on Form

1040-ES—The Declaration of estimated tax. First make out trial estimate on Form 1040. Keep this form to compare with actual income and deductions as the year progresses. File amended declarations for substantial deviations from estimate.

Pay unpaid balance of unforgiven 1942 tax.

Mar. 30—Pay property tax in full or installments.

Apr. 10—Deposit March withholdings in depository if more than \$100.

Apr. 20—File sales and compensating use tax return to city.

Apr. 30—Make quarterly return for first quarter (Form W-1).

Make quarterly return on Form SS 1-a.

Make quarterly return to state for unemployment compensation.

File state income tax return.

May 10—Deposit April withholdings in depository if more than \$100.

June 10—Deposit May withholdings in depository if more than \$100.

June 15—File General Business tax return to city.

June 15—Make quarterly payment of estimated tax for 1945.

File an amended declaration, if advisable.

July 10—Deposit June withholdings in depository if more than \$100.

July 20—File sales and compensating use tax return to city.

July 31—Make quarterly return of tax withholdings for second quarter (Form W-1).

Make quarterly return on Form SS 1-a.

Make quarterly return to state for unemployment compensation.

Aug. 10—Deposit July withholdings in depository if more than \$100.

Sept. 10—Deposit August withholdings in depository if more than \$100.

Sept. 15—Pay third installment of 1945 estimated income tax.

File an amended declaration if advisable.

Oct. 10—Deposit September withholdings in depository if more than \$100.

Oct. 20—File sales and compensating use tax to city.

Oct. 31—Make quarterly return for third quarter (Form W-1).

Make quarterly return on Form SS 1-a.

Make quarterly return to state for unemployment compensation.

Nov. 10—Deposit October withholdings in depository if more than \$100.

Dec. 1—Request filing of new certificate (Form W-4 revised) by each employe whose withholding exemptions will be different in the next year from the exemptions shown on his last certificate.

Dec. 10—Deposit November withholdings in depository if more than \$100.

Make adjustment for over-collection or under-collection of tax on a preceding quarter, or if more or less has been paid to Collector, by attaching a statement in duplicate explaining the adjustment and designating the quarterly return period in which the error occurred.

Form W-1 and W-3 the same as last year. Forms W-2 and W-4 have been revised.

Get your returns, reports and payments in as early as possible before due dates.

Change listings to comply with new laws.

Leave blank lines on calendar to insert new listings that may materialize during the year.

Withholdings for last month in quarter may be sent direct to Collector with the two depository receipts for the first two months in quarter if desired.

Work-in-Progress

An Important Factor in Accurate Costing

By Arthur Roberts

"MY SHOP was busier this month than last month," said Bill Burney, an eastern sheet metal contractor, "yet, my profit and loss statement shows a smaller profit." Bill explained further that he had checked all figures, had watched expenses carefully and that they totaled about the same in the previous period, yet, here he was with substantially less profit. It had him stymied, but after investigation, the riddle was easily solved. His problem was in failing to figure for "work-in-progress on jobs put into work in one fiscal period and not completed until another fiscal period"—a common fallacy in his field. Often, such hold-over jobs run into substantial sums.

There are two hazards lurking in a disregard for work-in-progress or its inaccurate computation.

1. Comparative analysis, the cornerstone of cost control, is thrown out of focus.

2. Estimates may be short-costed during a current period, causing considerable loss.

If work-in-progress is not considered at the time a profit and loss statement is prepared, the net profit will be too low. "What's the difference, the net will be that much higher in the next period," argued Bill, after we had explained the reason behind the low paper profit on his last statement. True. From period to period, the net profit will equalize itself, whether work-in-progress is considered or not and the sheet metal contractor's bankroll won't suffer, but he cannot get the right perspective of operating efficiency from period to period.

In other words, his comparative analysis will be off the beam and this begets the inability to utilize proper cost control without which no businessman can get maximum results today or in the postwar tomorrow. In this seller's market, which should carry over for some time into the postwar period, it is easy to get the business, but not so easy to make a profit on that business in these days of high taxation, restrictive regulations and a jittery economy, unless costs are policed continually. To control costs adequately, you must know your profit and take into consideration all factors that have a bearing on it.

Our experience discloses that the members of this industry who consider work-in-progress, handle it in four different ways:

a. They credit income with the sale when the job goes into work, which reverses the result experienced when work-in-progress is not considered at all. This inflates the profit for the first period, deflates it in the next. Both methods distort comparative analysis.

b. They "guestimate." Guesswork is bad business always.

c. They record only the cost covering work done in the period in which the work is done, this cost including all materials withdrawn from stock to the date of the statement, all labor done on the job to said date and the overhead pro-rated in ratio to the labor-hours worked.

d. They record job costs to the proper period and a pro-rata share of the net profit. In this case, materials and labor are computed to the date of the statement, overhead and net profit on the basis of labor-hours worked. This is the best method.

For example, say a job sold for \$150 and went into work on January 30, was completed on February 1, a profit and loss statement prepared on January 31, the job estimated as follows:

Labor—20 hrs. @ \$1.25 per hour.....	\$ 25.00
Materials	57.50
Overhead expense	52.50
Net profit	15.00

Selling price\$150.00

On January 31, the date of the statement, 12 labor-hours had been spent on this job, or 60 per cent of the total estimated, all materials had been put in work, so this work-in-progress should be recorded as follows:

Labor hours—12 hrs. @ \$1.25 per hour (60% of \$25)....	\$ 15.00
Materials—all put in work.....	57.50
Overhead expenses—60% of estimated \$52.50.....	31.50
Net profit—60% of estimated \$15.....	9.00

To be recorded on January statement.....\$113.00

To be recorded in next period when work is completed... 37.00

Selling price of job.....\$150.00

If \$113 is not recorded on the January statement, the net will be that much less than it should be. In all shops, jobs are often held over from period to period at the time a profit and loss statement is prepared. Such cases vary in number and dollar-volume, but every sheet metal contractor experiences such hold-overs from time to time. Sometimes they are jobs brought in at the end of the month that cannot be completed until the next month under normal time allowances, or, unusual conditions create them, such as delays in waiting for materials, or more important jobs coming in for immediate attention that side-track the earlier jobs temporarily. Work-in-progress runs to a surprisingly high figure at times in some shops and if not calculated right away, distorts the net profit considerably. We have known cases in moderately-sized shops where more than \$500 was carried over in this way, reducing the net for one period by this amount and inflating it the next period because work-in-progress was not considered. So much for the hazard to profit-finding and an intelligent analysis of operating figures.

In costing estimates, the omission of work-in-progress gives you another kick in the pants because it makes you price-cut your jobs unintentionally. Here's how.

Let's suppose Bill Burney disregards work-in-progress, prepares a profit and loss statement on March 31, for the first quarter, and has \$500 worth of work-in-progress at the end of the month, 4/5 of this work

completed. In other words, \$400 should be credited to March, but inasmuch as Burney does not credit income from these jobs until they are completed, the net profit in the first quarter will be \$400 short. How will this affect the costing of estimates for the next period? Remember that the safest way to assure profitable estimates is to base the ratios and other calculations on prior-period experience figures, no older than one year. In this case, Bill Burney will use figures for the prior quarter as yardsticks for costing estimates in the next quarter.

Burney's experience figures for the period from January 1 to March 31, are:

EXHIBIT A

Sales	\$7,500—100%
Cost of labor and materials.....	4,500— 60%
Margin of profit on sales.....	\$3,000— 40%
Overhead expenses	2,625— 35%
Net profit on sales.....	\$375— 5%

But this net is \$400 short. Bill should have made an allowance for the work-in-progress, then his profit and loss statement would look like this:

EXHIBIT B

Sales	\$7,500
Allowance for work-in-progress.....	400
Total income	\$7,900—100%
Cost of labor and materials.....	4,500— 57%
Margin of profit on all operations.....	\$3,400— 43%
Overhead expenses	2,625— 33%
Net profit on all operations.....	\$ 775— 10%

In this revised version, only the net profit and income change in dollars because all labor and materials used on work-in-progress jobs have been entered on the books during the first quarter, likewise, overhead expense. The net increases \$400 because the income for the period has increased \$400. If this isn't done, obviously, the net profit is deflated \$400 because the operating accounts have been charged with all costs on uncompleted jobs, not because Burney specially arranged it so, but because, under the standardized routine, his financial accounts function independently of his estimate-costing system, he pays or charges up labor as performed to the date of the statement, likewise, he records or pays for light, rent, insurance or other overhead expenses to the end of the month, materials used on jobs are charged on the profit and loss statement through a reduction in inventory at the end of a period and this reduction includes the materials used on work-in-progress, so unless Burney offsets the costs chargeable to work-in-progress with corresponding income, his figures are sure to be out of gear.

Few sheet metal contractors seem to recognize this twist in bookkeeping routine and this explanation

should clarify. In some instances, the work-in-progress is recorded on the books via a "Work-in-progress" account, in other cases, the adjusting figures are placed only on the profit and loss statement and the statements filed for reference. Either way will keep you straight on comparative analysis and estimate-costing.

If Burney did not record work-in-progress and used the experience figures on Exhibit A to cost jobs for the second quarter, he would estimate a job as follows:

Labor and materials.....	\$120— 60%
Overhead expense	70— 35%
Net profit	10— 5%

Selling price\$200—100%

Whereas, if he recorded work-in-progress, he would use the experience figures shown on Exhibit B and estimate a job in the second quarter this way, disregarding fractions of a per cent:

Labor and materials.....	\$120.00— 58%
Overhead expense	66.00— 32%
Net profit	20.66— 10%

Selling price\$206.66—100%

Burney would short-change himself \$6.66 on this job. On the basis of Exhibit A, he does \$7,500 quarterly, so he would short-cost his jobs \$225 the next quarter on the same volume of estimated work. This indicates the hazard to estimate-costing in not handling work-in-progress properly on the records. If a sheet metal contractor prepares profit and loss statements only yearly and bases the next year's estimates on these annual experience figures, if he, like Burney, did not allow for \$400 in work-in-progress at the end of the old year, he might short-cost his estimates in the new year by \$900. On the basis of Exhibit A, his annual net is \$1,500, so \$900 is a lot of money to a sheet metal contractor with this limited earning power.

Work-in-progress is just another one of the "bugs" inherent in business computation that the sheet metal contractor and dealer making installations must exterminate with an adequate understanding of proper recording practice. Of course, if the work-in-progress amounted to little at the end of a fiscal period, one needn't get too alarmed over comparative analysis or estimate-costing, but, unless you cover this calculation when you make out profit and loss statements, monthly, quarterly, semi-annually, or annually, you won't know whether the figure is substantial or inconsequential, so it pays to play safe.

The difference between successful operation and "just-get-by" in the installation of heating systems and production of sheet metal products is adequate recording and the ability to interpret recorded results accurately and intelligently. To hit this jackpot, work-in-progress is one factor you must not overlook.

Notice

Sheet Metal Contractors Ass'n of Wisconsin convention will be held as announced, Feb. 5 and 6, Hotel Schroeder, Milwaukee.

Sheet Metal and Warm Air Heating Contractors of Indiana convention has been cancelled.

Sheet Metal Contractors Ass'n of Illinois convention has been cancelled.

On Our Industry's Front

War Contracts to Be Repriced

WAR GOODS manufacturers whose prices are too high, comparatively, or are yielding too much profit will have to set closer prices and tighten their control of costs in the coming year as they pass through the repricing screen of a new Company Pricing Program, the War Department announces.

In a comprehensive program of reviewing prime contract and subcontract prices, War Department company pricing teams will examine the pricing policies of all companies which are now subject to statutory renegotiation, and some companies which are not. By adjusting in advance any prices which are unduly high, the program is designed to eliminate excessive costs, as well as the excessive profits which are now returned to the government in statutory renegotiation.

Companies which establish close-pricing policies will receive favorable consideration for a higher rate of profit in statutory renegotiation. Close prices are also a factor in retaining contracts when a production program is reduced in quantity. Many contractors favor close pricing policies in order to develop cost-conscious, efficient organizations, which will be better able to meet competition in the postwar period.

Developed from an experimental program which began last March, the Company Pricing Program is now in operation in 63 War Department procurement offices, which have already completed pricing policy discussions with more than 300 companies. In 1945, the program will continue on a comprehensive basis. Every company assigned to a War Department office for statutory renegotiation is automatically assigned to the same office for company pricing.

Companies whose pricing policies are inconsistent with the pricing responsibilities of the War Department are asked to meet with a company pricing team for general pricing discussions. The teams can coordinate the interests of all government procurement agencies, with the result that the contractor need negotiate pricing policies only once on all his war business.

Companies which wish to arrange a company pricing review, without waiting for routine selection, may request immediate selection by the offices to which they are assigned for statutory renegotiation.

Manpower Classification

WAR Manpower Commission, announces a uniform nation-wide system for classifying manpower orders of employers in five priority categories in the order of their relative importance to the national war effort.

The action was taken to reduce the chance of inequities that might arise in some industrial areas in which more than one item on the critical war production programs is being manufactured. Heretofore manpower priorities in each area were fixed by WMC area directors, but criteria to assure standard ratings throughout the nation had not been established.

The five categories, approved under an agreement

between WMC and the War Production Board, are as follows:

Priority Category	Definition	Origin of Assignment
1	Orders of exceptional national importance.	National
2	Emergency orders.	Area
3	Only orders from establishments that have been assigned a production urgency rating of III and whose production or service is behind schedule for manpower reasons or threatens to become so because of an expanded schedule, and only if they are orders for workers who will be engaged on "must" production or services, or on production or services with locally equivalent urgency ratings.	National Regional State Area
4	Only orders from establishments that have been assigned a production urgency rating of IV or that have been assigned a production urgency rating of III and whose orders have not been placed in priority category 3. Orders from such establishments will be placed in this category only if they are for workers who will be employed on the production or services that have been designated as "must" or equivalent in urgency.	Regional State Area
5	Orders from essential and locally needed establishments may be placed in this category if the orders require preferential treatment in referral and the establishments have been assigned a production urgency rating of V or above.	Regional State Area National

Under the system, any order in a local office of the United States Employment Service will be classed as a "non-priority" order unless it has been given a priority designation by the chairman of the National Manpower Priorities Committee, or by the WMC Regional, State or Area director.

Eligibility for priority treatment will be determined by the area manpower director with the advice and recommendation of the Area Manpower Priorities Committee. A production urgency rating must be given, however, before the WMC area director will assign a priority manpower rating to an employer.

Employers may obtain additional details from local offices of the United States Employment Service.

Certified Gas Performance

PLANS announced by the Association of Gas Appliance and Equipment Manufacturers will guarantee performance of gas fired warm air heating equipment.

Members of this association, representing most of the nation's manufacturers of gas-fired forced air heating equipment, believe the agreed-upon method of certifying home heating performance is one of the most constructive steps taken by the industry to protect the interests of home buyers. The association has approved a set of standards covering controlled temperatures, controlled air circulation, humidification and air filtering. Any house built according to these standards will receive the association's certifica-

tion of satisfactory performance, it is said.

To some extent, the heating standards set by the manufacturers follow the CP plan for gas ranges. Not only have the competitive manufacturers agreed on the home heating standards, the chairman said, but they also have been correlated with the ASHVE, the Bureau of Standards, the American Standards Association, gas company engineers and other heating authorities. The heating units of the manufacturers must pass minimum requirements of the American Gas Association in addition to the certified quality in order to qualify in the certification plan.

The Association of Gas Appliance and Equipment Manufacturers will undertake an educational program to acquaint the public on how certified heating performance may be obtained and cooperation of local gas companies is being sought in putting the plan into action.

♦ **Stoker Prices**

USE OF March 1942 prices as the basis for pricing new household and commercial stokers, when production is resumed, was discussed at the first formal meeting of the OPA's recently appointed Stoker Manufacturers' Industry Advisory Committee.

The committee elected permanent officers and formed a task committee that will help draw up a cost questionnaire to be sent industry members to determine what price adjustments may be necessary.

Industry members hoped a fair volume of stokers will be in production by mid-1945 and that accumulated replacement requirements will be taken care of by the end of 1945. The industry was allotted materials by the War Production Board for the production of 37,500 stokers during the last quarter of 1944 and in each quarter of 1945. Production so far, however, has been curtailed because of the short supply of fractional horsepower motors.

Approximately 200 firms manufacture stokers, the normal annual production of which is 195,000 units, a \$25,000,000 market. Fully 75 per cent of the stoker volume is produced by eight manufacturers. About 1,000,000 installations have been made, of which from 60 to 65 per cent are located in eleven units. About 50 per cent of the facilities of these firms is now engaged in war work consisting for the most part in production of large stokers for essential industry factories. Production of household stokers has been frozen for the past 2½ years.

Prices of stokers at the manufacturing level are controlled by the general consumers' durable goods and building materials regulation (Maximum Price Regulation No. 188).

♦ **Stoker Production**

MEMBERS of the Stoker Manufacturers Advisory Committee have been advised by the War Production Board that authorizations for the first quarter of 1945 under the regular program as originally approved when Limitation Order L-75 was revised early in October, 1944 (AA, Oct., page 49), will be subject to a more critical review than was the case early in the fourth quarter. While a number of authorizations to manufacture Class B stokers have been granted, only a very small portion of the allocation will be produced by the end of this year.

Originally, the industry was authorized to produce

37,500 Class B stokers per quarter starting with the fourth quarter of 1944. However, in view of the curtailment of spot authorizations in critical labor areas and the general "freezing" of most or even all so-called civilian production because of urgent war requirements, the original plans for the production of 150,000 Class B stokers are subject to possible revision as may be deemed necessary by WPB. In a few words, we are on a day-to-day basis and we cannot foretell with any degree of certainty what changes or revisions may be necessary, what new regulations or restrictions may be imposed, or what new problems may arise, all of which will contribute one way or another to the eventual solution of problems involving Class B stoker production and sales.

♦ **Future Oil Burner Prices**

USE OF March, 1942, prices as the basis for pricing new household and commercial oil burners, when production is resumed, was discussed at the first formal meeting of the OPA's recently appointed Oil Burner Industry Advisory Committee.

The committee elected permanent officers and decided to hold another meeting early in January in Washington to discuss with OPA the effect on oil burner ceilings if prices on parts not manufactured by the industry are increased.

Industry members stated that a fair volume of oil burners will be in production by July 1945 and that they anticipate taking care of accumulated replacement requirements by the end of 1945. Although the War Production Board has allocated materials for the production of 30,000 oil burners for civilian use during the last quarter of 1944, the short supply of fractional horsepower motors has prevented full achievement of this program.

Approximately 200 firms manufacture oil burners, the normal annual production of which amounts to about 335,000 units, a \$25,000,000 market. Fully 80 per cent of this production has been handled in normal times by some 50 firms. About 80 per cent of the facilities of these firms is now engaged in war work.

Prices of oil burners at the manufactured level are controlled by the general consumers' durable goods and building materials maximum price regulation (Maximum Price Regulation No. 188).

♦ **Ask Motor Control After V-E**

MAINTENANCE of present controls on commercial-type motors, even after victory in Europe is assured, in order to distribute properly the supply of motors among all companies manufacturing civilian items such as washing machines, refrigerators and furnace blowers, was recommended at a recent meeting of the Fractional Horsepower Motor Labor Advisory Committee.

Advance notice of pending cutbacks, at least 30 days before the effective date of any employee lay-offs, should be furnished to labor organizations in the motor manufacturing plants involved, members emphasized. Such warnings would provide national labor organizations with sufficient time to soften the blow to employees and assist in re-channeling labor to other essential wartime or civilian activities, they said. However, cutback information is not always available

(Continued on Page 202)

AMERICAN ARTISAN

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The "How, What and Why" of the New Winter Air Conditioning Manual

BY
S. KONZO*

HOW TO USE IT
WHAT RESEARCH BACKS IT UP
WHY EVERYBODY SHOULD ADOPT IT

The New Manual Simplifies Engineering

TO ALL heating men, be they old, new, or prospective:

This is an open letter addressed to all of you. Whether you are an old timer who has seen this heating industry go through two wars, or whether you are a newcomer who feels that the industry offers great opportunities, I feel that we can discuss some problems of mutual interest.

Period of Change

Let me give you a brief history of warm air heating, as far as the design procedure is concerned. In the first place, winter air conditioning, or forced warm air heating, or mechanical warm air heating is a depression baby. It got its start in the early thirties in spite of unfavorable business conditions and it has grown amazingly in the past 15 years. In the beginning, and even now by some people, this winter air conditioning system was considered as merely a slight extension of a gravity heating system. In the beginning that may have been true. In the early days, most of the installations were conversion jobs in which a smaller casing was wrapped around a furnace, a blower was installed, a few pipes were changed, and miracles were expected. We find even now a great many heating contractors who feel perfectly comfortable when it comes to any discussion of a gravity warm air system, but who feel a bit uneasy about any system that uses a blower. And yet there need be no such sense of mystery surrounding a system that has a blower attached.

In the early years when new ideas were a dime a dozen, and when every manufacturer was knocking his brains out in an attempt to get something different, we could expect a lot of newly coined words, new ideas, new gadgets, and new concepts. I believe that we have weathered this period of confusion, and that we are now ready for an era of good housekeeping, of putting things where they rightfully belong, of consolidating the good ideas that have proved to be practical, and of standardizing some of our practices.

So that—if you are an old timer who has been subjected to a dozen different design methods, and who has seen Company A claim that their method of design is sounder than Company B's,—we think we can finally offer you a set of standards, a few basic rules, a list of clear cut recommendations that cuts

across all company lines and all individual preferences. To the newcomer in the field we can now offer a complete set of rules and procedure on how to design, how to install, and how to operate warm air heating systems, that can be duplicated in no other type of heating system, bar none. Regardless, therefore, of whether you are an old timer or a newcomer, we want you to read our story. You will not lose by it. You have much to gain by a clear understanding of the new CODE AND MANUAL for the Design and Installation of Warm Air Winter Air Conditioning Systems.

How to Start a Standardization Movement

Just imagine for a moment that you had the time and the facility to go before a representative group of register manufacturers and tell them: "Listen fellows, I've got too many register styles and models and sizes cluttering up my storage bins. Can't you fellows standardize on some of these sizes? Surely we don't have to have all of them in our business?"

Suppose that you continued your quest and approached in turn the blower manufacturers, and the filter manufacturers, and the fittings manufacturers, and the furnace manufacturers, and such fuel groups as the stoker people, the oil burner people, and the gas people, and many other groups who all have a voice in this industry. Suppose that before each of these groups you presented the same request: "Listen fellows, we heating contractors are a bit confused by all of your claims. Can't you fellows standardize and give us a simple and single approach?"

Do you know what the answers would be? In every case, the answer would go something like this: "We would be glad to help out and to standardize and to simplify our trade practices, but we cannot do it alone. We cannot standardize on register sizes, for example, if the furnace manufacturers want non-standard sizes, and if the fittings manufacturers think we are off the beam, and if each heating contractor thinks that he has to have something special for his own little territory."

You might say that we got in on this problem through the back door. We had an idea that it might be solved only if the National Warm Air Heating and Air Conditioning Association handled it through their Research and Codes Committees. The Board of Directors of the Association gave us a green light to handle it in any way we saw fit, as long as it assisted industry. This is a summary of our report.

*Special Research Professor, Engineering Experiment Station, University of Illinois.

Differences in Approach between Old Methods of Design and the New Manual Method

A. Here are some items that had to be taken into account in older methods of design.	B. Here are the ways in which these items were accounted for when the tables of capacities were built by us.	C. Here are the only items that you will have to specify in using the new Manual method of design.
1. Cubic content of rooms and house. (Obtained by measurement.)	1. This item is not necessary and has been omitted.	
2. Required number of air changes. (Some value was assumed.)	2. Tests show no necessity of specifying any air changes. Hence this item was omitted.	
3. Total required air volume delivery. (Calculated from 1 and 2.)	3. It is possible to set up tables without referring to c.f.m. air deliveries. This item was therefore omitted.	
4. Total B.t.u. heat loss from building. (Obtained from heat loss calculations.)	4. This is essential for any method of design, and is retained.	4. This item is used in selecting size of furnace required. Tables for furnace and blower selection have been standardized.
5. Average register air temperature. (Obtained from a chart or table.)	5. We are not interested in average temperatures. Item has been omitted.	
6. Average length of branch ducts from bonnet to register. (Obtained from measurement of drawings.)	6. We are not interested in average lengths of ducts, and hence this item has been omitted.	
7. Average temperature drop in ducts. (Value assumed.)	7. We are not interested in average temperature drops. Item omitted.	
8. Bonnet temperature to be used. (Obtained from items 5, 6 and 7.)	8. A bonnet temperature of 165 deg. was assumed, as the only value consistent with furnace testing procedure. This is a 100 deg. temperature rise of air.	
9. Temperature drop in individual ducts. (Assumed as the same as item 7.)	9. Temperature drop values as obtained from laboratory tests were used. These values take into account size of duct, and air velocity.	
10. Register temperatures for each individual register. (Obtained from item 9 and lengths of each branch from bonnet to register.)	10. These have been incorporated into the capacity tables, and no separate determination of these temperatures is necessary.	
11. Factor for calculating the c.f.m. for each register. (Obtained from chart or table.)	11. These have also been incorporated into the table of capacities. No separate determination is necessary.	
12. B.t.u. heat loss from each room. (Obtained from heat loss calculations.)	12. This is basic information and is necessary for any design method.	12. B.t.u. heat loss from each room is required.
13. C.f.m. for each room. (Obtained from items 11 and 12.)	13. These values were used in setting up the tables, but no separate determination is necessary.	
14. Length of straight duct from bonnet to each register. (Obtained from measurement of duct plan.)	14. This item is retained since it is the unknown item on each job that affects temperature drop and frictional resistance.	14. Length of straight duct IN BASEMENT ONLY, from bonnet to boot. Riser lengths have been accounted for in tables.

We went to the register people, and the fittings people, and the filter people, and the blower people, and the control people, and many others—together we have met or corresponded with between 150 to 200 men in industry at dozens of meetings and conferences—and we got a flood of ideas and suggestions. We boiled these ideas down. We served as a central clearing house for ideas, and we are finally able to offer to industry a thoroughly thought out and practical MANUAL that is a distinct step towards improved design and installation of all warm air heating systems. We want you to understand that this CODE AND MANUAL is not one man's story. It represents the best ideas and thoughts of over 150 men—every sentence and phrase has been subjected to critical analysis by a special key committee of 15 men in the United States and Canada. The Association and the individuals who gave of their time have spent several thousand dollars doing a job that no single company

could have done. Our next job, therefore, is to sell you on this CODE AND MANUAL.

Design Methods Can Be Simple

We know that you are not going to discard all of your catalogs and design methods, merely because we tell you that we have a design method that is, from this point forward, going to become *the* standard. We know that you like to hang on to c.f.m. and static pressure, and temperature drops and air changes and register temperatures and bonnet temperatures, etc. In our new CODE AND MANUAL you will not find even one reference to some of these items just listed. We have dropped most of these terms for one main reason. We think it is possible to design a winter air conditioning duct system without all the mystery and the mumbo-jumbo of the past. We do not think that the heating contractor need decide whether the bonnet temperature shall be 150 or 165 deg., or whether

Differences in Approach between Old Methods of Design and the New Manual Method

A. Here are some items that had to be taken into account in older methods of design.

B. Here are the ways in which these items were accounted for when the tables of capacities were built by us.

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| <p>15. Equivalent lengths of fittings in each run. (Estimated from inadequate tables.)</p> <p>16. Total pressure loss for duct system. (Assumed for each installation.)</p> <p>17. Pressure loss per 100 ft. of duct. (Obtained from item 16 and length of longest run.)</p> <p>18. Equivalent diameter of round branch. (From chart or table for friction loss.)</p> <p>19. Rectangular duct size. (From tables.)</p> <p>20. Register velocity. (Assumed for low or high sidewall registers.)</p> <p>21. Register size. (Nominal size obtained from manufacturer's catalogues.)</p> <p>22. Determination of trunk sizes by adding c.f.m. handled by each portion of trunk, and taking into account such items as total pressure loss of the trunk lines, and pressure loss per 100 ft. of run.</p> <p>23. Estimating total pressure loss in system by taking into account losses through ducts, and then selecting the blower from a catalogue.</p> <p>24. In some systems even additional items have to be assumed, selected, calculated, or read from charts and tables. This mumbo-jumbo and ritual sounds extremely scientific and technical, but it is no assurance of a good job.</p> | <p>15. A much more complete set of values has been shown in diagram form, so that less guessing is involved.</p> <p>16. Total pressure loss for system external to the furnace casing was assumed as 0.20 in. This value is consistent with furnace test methods.</p> <p>17. This item has been incorporated into the tables and no separate determination is required.</p> <p>18. The table of standard sizes shows immediately the size of round pipes required.</p> <p>19. The same table of standard sizes shows immediately the sizes of rectangular ducts required.</p> <p>20. The tables have been checked to insure reasonable values for register velocity, and no separate determination is necessary.</p> <p>21. The table of standard sizes shows immediately the size required.</p> <p>22. An approximate method is shown that requires only the addition to the main trunk for each branch trunk. This is not precisely exact, but is adequate in view of many uncertainties in temperature drop in ducts and pressure losses of fittings.</p> <p>23. This very bewildering step has been eliminated entirely. If you have item (4) above you have all the data required to select furnace and blower.</p> <p>24. We have found it impossible to train men in any system in which we have to deal with a lot of abstract terms or values that cannot be readily measured, felt, or seen. Hence, these have been almost entirely taken out of the hands of the dealer and installer.</p> | <p>15. Equivalent lengths of fittings and registers only. Easy-to-use diagrams are shown.</p> <p>The above 5 items are all that are required for sizing branches, whether round or rectangular or square; for sizing stacks, boots, and stackheads; for sizing registers, return intakes, and register locations; and for sizing of furnace required. Nowhere in the MANUAL does the installer have to figure cfm, static pressures, or temperatures.</p> <p>21. All that is required is to indicate where the register has to be located, what model is to be used, and the finish required.</p> <p>22. If you can add two numbers together you can get the size of trunk duct for any number of branches or any complexity of branches and trunks.</p> <p>23. The Manual requires that the manufacturer of equipment also cooperate to the fullest extent by furnishing catalogue information that ties in with the standards set forth in the manual.</p> |
|--|---|--|

the temperature drop in the duct shall be 0.2 or 0.5 or 1.0 deg. per foot of run. To do so merely complicates the story, so that we find our heating contractors in the same frame of mind as when they are confronted with the intricacies of the income tax blank.

Design Methods Should Include Reliable Data

We want it thoroughly understood, however, that merely because no mention is made of static pressure or temperature drops, these have not been taken into account. We have spared no pains to secure the best and most reliable engineering data now available. These data have been utilized by us and have been worked into tables of capacities and standard sizes. In other words, where there was a choice between several values, we made the choice. For example, practically all furnace testing codes require that the air temperature rise through the furnace unit shall

not exceed about 100 deg. F. This places a top limit on the allowable bonnet air temperature that can be used for design. We have used this top limit of 165 deg. as the starting point for the bonnet air temperature, for all installations and under all conditions. It is the only logical starting temperature for design purposes that will conform with the rating requirements of all furnaces. It is useless, for example, to specify temperature rises of say 70 deg. for an oil fired unit, since no oil test code specifies temperature rises less than 90 deg.

In the same way we have definitely specified the total pressure loss of the duct system. You will not be required to state, or to choose, between 0.08 in. or 0.10 in. or 0.12 in. per 100 ft. of duct. We have chosen once and for all, a value of 0.10 in. total pressure loss, since that is the only pressure loss that is now required in the test of furnaces by any of the

(Continued on page 220)

How to design

Warm Air Panel Heating Systems

By F. E. Giesecke
Texas A. & M. College

A STUDY of panel heating should be based on a clear understanding of the nature of heat and of the transfer of heat by conduction and by radiation.

Heat is the energy of molecular motion. The difference between hot air and cold air is the difference between speed of the motion of the molecules. In hot air the molecules move faster than in cold air. Similarly, the difference between a hot iron bar and a cold iron bar is the difference between the velocities at which the molecules of the two bars move. All bodies are composed of molecules; molecules are composed of atoms, and atoms are composed of electrons. In all bodies whose temperatures are higher than absolute zero, 460 degrees below zero (Fahrenheit scale), the molecules, atoms, and electrons are in continuous motion. As the result of these complicated motions, all bodies radiate energy at all times.

The principal radiator of energy in our universe is the sun. The sun radiates energy in all directions all the time; a very small portion of the radiated energy is intercepted by our earth. The radiation which comes to our earth from the sun has various wave lengths. Fig. 1 illustrates that portion of the solar radiation which reaches our earth; its wave length varies from 2,000 to 150,000 "angstroms." An angstrom is equal to 1 inch divided by about 250,000,000,000.

The "effect" of solar radiation varies with its wave length; radiation having a wave length from about 150,000 to about 8,000 angstroms is called *heat* radiation because, when it is intercepted by a body, its energy is transferred to the molecules of that body; the velocity of the motion of the molecules is increased thereby and the temperature of the body is raised. In other words, when *heat* radiation is intercepted by a body the energy of the radiation is transformed into *heat*. The radiation itself has no temperature; it leaves the sun with a velocity of about 186,000 miles a second, passes through about 92,900,000 miles of space having a temperature of absolute zero and arrives at our earth in 8 minutes.

Solar radiation having a wave length from about

8,000 to about 4,000 angstroms is called *light* radiation because the human eye and the human brain are constituted so that this particular wave length enables man to see. Light radiation is sensed as red light if it has a wave length of about 8,000 angstroms and as blue light if it has a wave length of about 4,000 angstroms. If radiation has a wave length greater than 8,000 angstroms it is called *infra-red* radiation, and if it has a wave length shorter than 4,000 angstroms it is called *ultra-violet* radiation. Neither can be sensed by the human eye, but both can be detected by properly prepared photographic plates. Heat radiation and light radiation differ from each other only in their wave lengths; both are emitted from their radiating points in all directions, in straight lines, and with a velocity of about 186,000 miles a second. Both can be reflected and refracted and both can be absorbed.

How Heat Radiates

Just as the sun radiates energy in all directions, so does every point of every surface of every body so long as the temperature of the surface is higher than absolute zero.

If an iron bar is heated slowly, the increase in its temperature can at first be detected by touching it; later, when the bar is too hot to touch, the heat radiation coming from its surface can be detected by holding the hand near the surface; still later, when the temperature has reached about 1,000 degrees the surface begins to glow; i.e., short wave radiation (light radiation) is being emitted in addition to the heat radiation; still later, when the temperature reaches about 2,500 degrees the rod appears white; at that time the rod is emitting the long wave heat radiation and also the short wave light radiation ranging from the infra-red to the ultra-violet wave lengths which together produce white light.

The rate at which the surface of an iron bar, as well as the surface of every other body, emits heat radiation depends on the temperature of the surface and on the character of the surface; at like temperatures, a rough iron surface emits more heat radiation than a polished aluminum surface. In all cases, the rate of heat radiation is proportional to the fourth power of the absolute temperature of the surface.

If the surface of a body radiates energy at a high rate, it also *absorbs* energy at a high rate. If a surface absorbs all the energy which impinges on it, it is a *perfect absorber*; such a body is also a *perfect radiator*. There is no perfect radiator in nature; if there were, it would radiate energy at the rate of

$$0.174 \left(\frac{K}{100} \right)^4 \text{ Btu. per hr. per sq. ft., i.e., if the area}$$

of such a surface were 1 sq. ft. and its temperature 100 F. or 560 K, it would radiate 171 Btu. per hr.

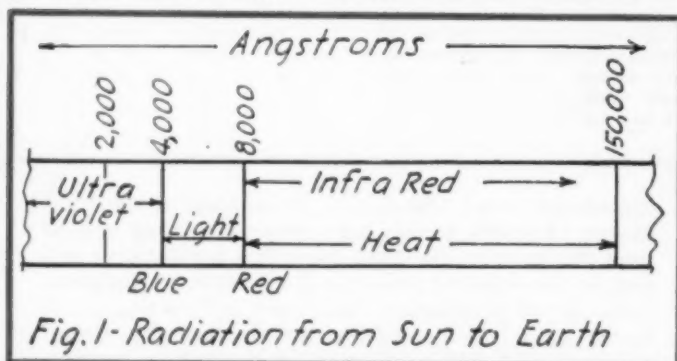


Fig. 1-Radiation from Sun to Earth

tion because, when it is intercepted by a body, its energy is transferred to the molecules of that body; the velocity of the motion of the molecules is increased thereby and the temperature of the body is raised. In other words, when *heat* radiation is intercepted by a body the energy of the radiation is transformed into *heat*. The radiation itself has no temperature; it leaves the sun with a velocity of about 186,000 miles a second, passes through about 92,900,000 miles of space having a temperature of absolute zero and arrives at our earth in 8 minutes.

into space (F is the ordinary temperature on the Fahrenheit scale and K is the absolute temperature on that scale). A perfect radiator is also called a *black body* and its radiation is called *black radiation*; all other radiation is called *gray radiation*.

An ordinary plastered ceiling radiates heat at the

rate of about $0.156 \left(\frac{K}{100} \right)^4$ Btu. per hr. per sq. ft.; i.e.,

its rate of heat emission, therefore, is about 90 per cent of that of a "black" body; the rate of heat emission of other building materials are similar; some are slightly higher and some slightly lower.

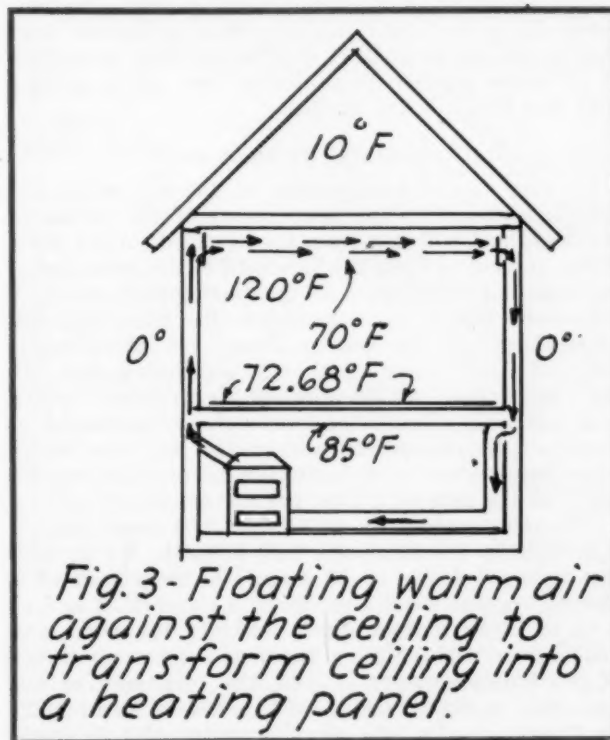
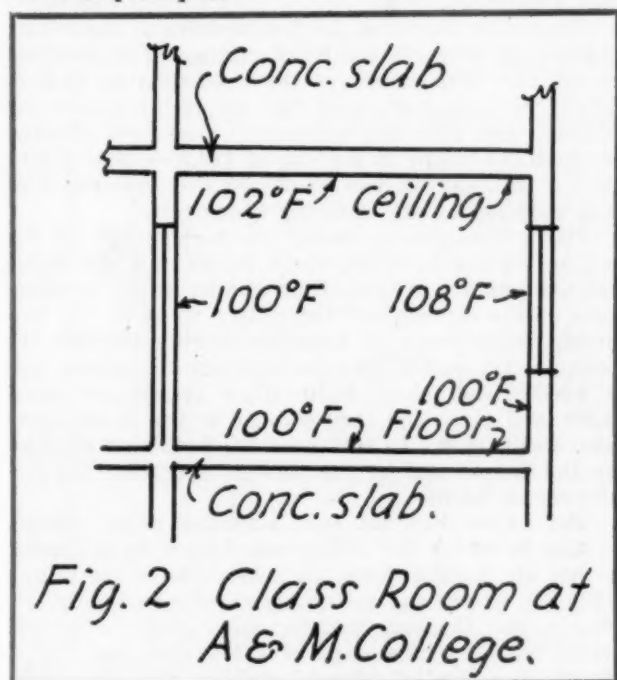
In designing panel heating or radiant heating systems it is not necessary to "split hairs" in the calculations because many of the factors which enter into these calculations have values which can be determined only approximately. For that reason it is sufficiently accurate to assume that the average rate of heat emission of all surfaces in buildings emit heat radiation at the rate of 90 per cent of that of the

black body or at the rate of $0.156 \left(\frac{K}{100} \right)^4$ Btu. per sq. ft. per hr.

Fig. 2 shows a section of a west corner classroom at Texas A. & M. College and its surface temperatures at 5 p. m., August 3, 1944. The building has a concrete frame; its exterior walls are of 8 in. tile with a 4 in. brick veneer; a 6 in. concrete slab forms floor and ceiling. The floor temperature was 100 F., the ceiling temperature 102 F., the outside wall temperature 100 F., the inside wall temperature 108 F., the glass temperature 108 F. (while the sun was shining on the glass). The indoor air temperature was 92 F. and the outdoor air temperature 91 F. At that time the ceiling was radiating heat into the room

at the hourly rate of $0.156 \left(\frac{460 + 102}{100} \right)^4 = 156$ Btu.

per sq. ft.; the floor at the rate of 153; the walls at the rate of 153, and the glass windows at the rate of 162 Btu. per sq. ft.



It is evident that the entire room was filled with heat radiation coming from all sides and radiating in all directions. It is also evident that it is immaterial whether a room is heated by means of warm air, or hot water, or steam, or electricity, or by the sun shining on the roof or on the walls, or whether the room has or has not an artificial source of heat, the room is always completely filled with heat radiation, day and night, winter and summer. It is also evident that every person is always completely immersed in and surrounded by heat radiation, exactly as a fish, swimming under water, is immersed in and surrounded by water. This is an important fact which must be clearly understood by every student of panel heating or radiant heating.

It is evident that when a room is heated by means of a floor panel, or a ceiling panel, or a wall panel, the heat radiation emitted by the panel supplements the heat radiation already present in the room and tends to equalize the temperatures of the surfaces enclosing the room, as shown in Fig. 2, where all the heat was supplied by solar radiation striking the two outside walls of the room.

Types of Warm Air Panels

As an introductory study of the heating of a room by means of floor and ceiling panels, the building shown in Fig. 3 may be considered. A warm air furnace is located in the basement; warm air is carried from the furnace by ducts located in one of the walls and is discharged into the room through registers located near the ceiling; the warm air floats along the ceiling to the opposite wall, enters registers near the ceiling, and returns to the basement through ducts in the wall. The temperature of the air in the room is assumed to be 70 F. and it is assumed that the basement air, floating against the floor, is at a temperature of 85 F., and the room air, floating against the ceiling, at 120 F. It is desired to determine to what extent, under these conditions, the floor and ceiling function as heating panels.

If a floor is to function as a heating panel, the temperature of its upper surface must be higher than that of the air in contact with it and heat must flow to its upper surface from the warmer air in contact with the floor's lower surface.

"Resistance" to Heat Flow

So long as the temperature of the air under the floor is higher than the temperature of the air above the floor, heat will flow from the basement to the room above. In flowing from the basement to the room above, the heat must overcome (a) the "resistance" of a thin stationary film of air attached to the floor; (b) the "resistance" of the wooden floor; (c) the "resistance" of the linoleum or other floor covering, and (d) the "resistance" of the film of air attached to the floor covering. These "resistances" are expressed in terms of the temperature drop—in degrees—which takes place when heat is flowing across the "resistance" at the rate of 1 Btu. per hr. per sq. ft.

The resistance of an air film is 0.61 when the air is practically quiescent and 0.17 when the air is moving with a velocity of 15 mph.; the resistance of a slab of average wood 1 in. thick is about 1.25, and of a $\frac{3}{4}$ in. wooden floor about 0.94; if the floor is a double floor with building paper and if the resistance of the building paper is 0.04, the resistance of the floor will be about $0.94 + 0.04 + 0.94$ or about 1.92; the resistance of a floor covering varies with its thickness and its character; in the present example it may be considered equal to 0.25, which is about right for a covering $\frac{1}{4}$ in. thick and somewhat denser than wood. The sum of the four resistances, $0.61 + 1.92 + 0.25 + 0.61$, is 3.39.

How Resistance Is Calculated

For general calculations it is sufficiently accurate to use 3.5 as the resistance of a double wood floor with building paper and covered with linoleum or with light rugs, and 2.5 as the resistance of a single wood floor covered with linoleum or light rugs.

This means that if heat is flowing from the basement, through the floor, to the room above at the rate of 1 Btu. per sq. ft. per hr., the temperature drop will be 3.39 degrees. Since there is a temperature drop of 15 degrees from 85 F. air in the basement to 70 F. air in the room (Fig. 3 example) heat will flow at the rate of $15/3.39$ or 4.4 Btu. per sq. ft. per hr. Since the resistance of the film of air in contact with the linoleum is 0.61 and since heat is flowing across this resistance at the rate of 4.4 Btu. per sq. ft. per hr., the temperature drop through the film is 4.4×0.61 or 2.68, and the temperature of the upper surface of the linoleum will be equal to the air temperature, 70 F., plus 2.68 or 72.68 F., and it will radiate heat energy into the room at the rate of:

$$0.156 \left(\frac{460 + 72.68}{100} \right)^4 \text{ or } 126 \text{ Btu. per sq. ft. per hr.}$$

The energy radiated by the floor is radiated toward the ceiling and toward the four walls; the floor receives the energy radiated by those five surfaces toward it, so that the heat delivered to the room by the floor is only the difference between the radiation from the floor and the radiation to the floor.

Calculations for a Ceiling Panel

Considering the ceiling as a heating panel, it is evident that the temperature of the ceiling depends upon (a) the temperature of the air in contact with

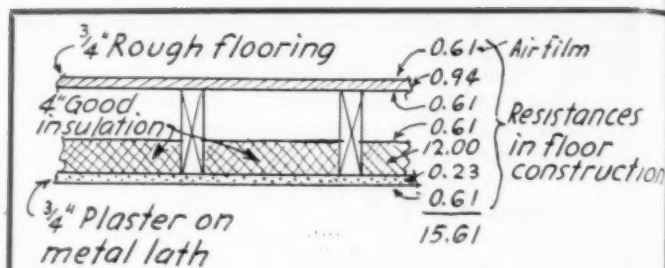


Fig. 4. Resistance to Heat Flow

it and (b) the rate of heat flow upward through the ceiling. It is also evident that if the temperature of the space above the ceiling and the resistance to heat flow of the ceiling are known, the temperature difference between the ceiling and that of the air in contact with it can be calculated. For example, if the ceiling construction consists of $\frac{3}{4}$ in. plaster on metal lath, 4 in. of good insulating material and $\frac{3}{4}$ in. wood flooring, its resistance to heat flow will be (see Fig. 4):

Air film	0.61
Wood flooring, $\frac{3}{4}$ in.	0.94
Air film	0.61
Good insulation, 4 in.	12.00
Plaster on metal lath, $\frac{3}{4}$ in.	0.23
Air film	0.61
Total	15.61

Hence, if heat flows through the ceiling at the rate of 1 Btu. per hr. per sq. ft., the temperature drop must be 15.61 degrees. If the attic temperature is 10 F., and that of the warm air floating against the ceiling is 120 F., the temperature difference is 110 degrees and the flow of heat through the ceiling is at the rate of $110/15.61$ or 7 Btu. per hr. per sq. ft.

The temperature drop through the air film attached to the ceiling will be 7×0.61 or 4.3 degrees, and the ceiling surface temperature will be $120 - 4.3$ or 115.7 F. when the temperature of the floating air in contact with it is 120 F.

The writer examined the temperature of the ceiling surface in a booth used for testing radiators and found the temperature of the ceiling to be 88.6 F. when the temperature of the air, 3 in. below the ceiling, was 93.3 F.; evidently, heat was flowing through the ceiling at the rate of $(93.3 - 88.6) \div 0.61$ or 7.7 Btu. per hr. per sq. ft.; in this case the heat was supplied by the radiator under test.

The writer also examined the temperature of the ceiling surface in a two-story textile mill and found the temperature of the ceiling as well as the temperature of the air beneath the ceiling to be 94 F.; evidently, in this case no heat was flowing through the ceiling; this was to be expected since the ceiling was a wooden slab about 5 in. thick (resistance about 6.25) and since the temperature in the room above was about 90 F. In this case the heat was supplied by the motors and by the persons operating the machinery in the mill.

The writer has not seen a ceiling panel heating system in which the ceiling was heated by a blanket of hot air flowing along the lower side of the ceiling (Fig. 3), but he can see no reason why such a system should not function satisfactorily. Such a system would have the advantage of a low first cost and it would, to a limited extent, combine the advantages

Table 1. Calculated Heat Loss of a Room (+ 10° Outside Temp.)

Surface	Area, Sq. Ft.	U	Temp. Differ- ence	Calculation	Heat Loss, Btu/h
Outside walls	260	0.25	60	$260 \times 0.25 \times 60$	3,900
Glass	55	1.13	60	$55 \times 1.13 \times 60$	3,730
Inside walls.	315	...	..	No heat loss	....
Ceiling	300	...	..	Heating panel	....
Floor	300	0.34	25	$300 \times 0.34 \times 25$	2,550
Infiltration .	2,700 cu. ft.	×		$1.50 \times 60 \times 0.018$	4,370

Total 14,550

of air conditioning with those of panel heating because the air could be cleaned, heated, and humidified before it leaves the basement, and even though the larger part of this air would only flow across the upper part of the room, a part of it would intermingle with the air in the room and thereby affect its quality.

The usual method of constructing warm air panel heating systems is to form ducts above the ceiling through which the air flows while it is in contact with the ceiling. These ducts may be formed between ceiling joists, or in hollow tile, if tile construction is used, or the ceiling may be suspended below the floor construction so that the ducts can be formed as a "panel" between the ceiling and the floor construction. This method has been in use in Germany for a considerable period of time; the system is known there as Warm Air Ceiling Heating (Warmluftdeckenheizung). The illustration in Fig. 6 is taken from a book on Radiant Heating by Heid-Kollmar, published in 1939. In the United States the system was developed by H. F. Randolph; it is fully described in a paper presented at the semi-annual meeting of the American Society of Heating and Ventilating Engineers in June, 1943.

Step-by-Step Design Procedure

The design of a warm air panel heating system for the room shown in Fig. 3 may be made as follows:

1. Calculate the heat loss of the room in the usual way and as indicated in Table 1, which shows a loss of 14,550 Btu. per hr. for an indoor temperature of 70 F. and an outdoor temperature of 10 F.

Table 2. Mean Surface Temperatures

	Area	Temp.
Floor	300	$64.8 = 19,440$
Exterior walls	260	$60.8 = 15,800$
Windows	55	$28.6 = 1,570$
Interior walls	315	$70.0 = 22,050$
Total	930	58,860
		$58,860/930 = 63.3 F.$

2. Determine the interior surface temperatures of the floor, walls, and windows.

For the floor, its surface temperature depends upon the temperatures of the air in the space below the floor; if that temperature is 45 F., the flow of heat through the floor will be 0.34 (70 — 45) or 8.5 Btu. per hr. per sq. ft. The temperature drop through the air film is 8.5×0.61 or 5.2 degrees, so the floor surface temperature will be 70 — 5.2 or 64.8.

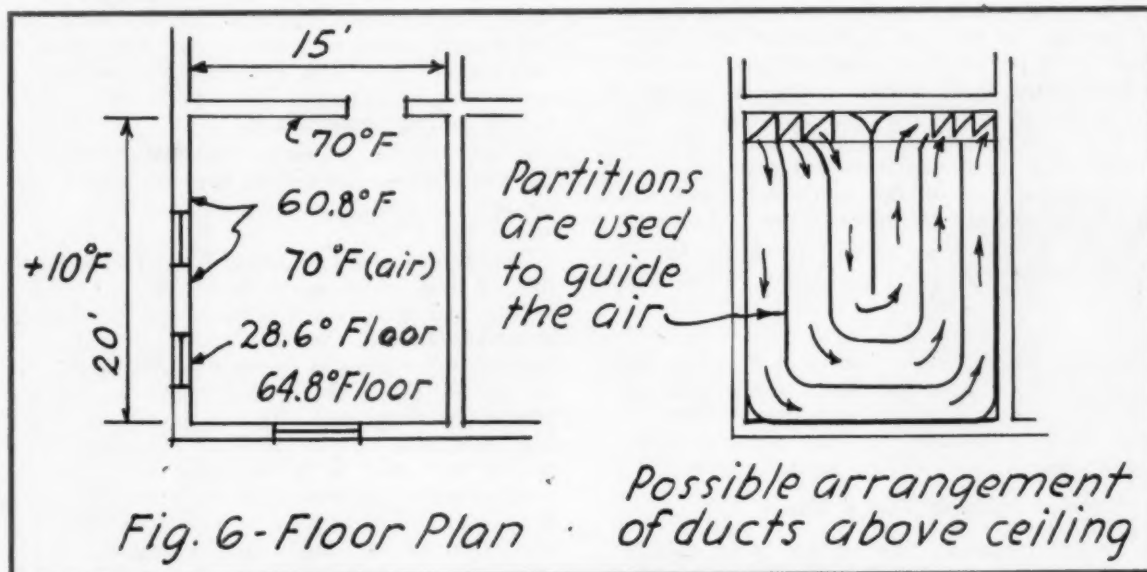
For the exterior walls, Table 1 shows a flow of heat through the walls of 0.25 (70 — 10) or 15 Btu. per hr. per sq. ft. The temperature drop through the air film is 15×0.61 or 9.2 degrees, so the wall surface temperature will be 70 — 9.2 or 60.8 F.

For the windows, Table 1 shows a flow of heat through the glass of 1.13 (70 — 10) or 67.8 Btu. per hr. per sq. ft. The temperature drop through the air film is 67.8×0.61 or 41.4 and the glass temperature will be 70 — 41.4 or 28.6 F.

For the interior walls, the surface temperature may be assumed to be 70 F., the same temperature as the indoor air, if the adjoining rooms are heated to 70 F.

3. Determine the "mean radiant temperature" of the floor and the four walls.

Since the rate of radiation from a surface varies as the fourth power of its absolute temperature, calculations of mean radiant temperatures should be based on the fourth powers of the temperatures, but since the resulting calculations are complicated and since the resulting mean radiant temperature differs only very slightly from the mean surface temperature, it is sufficiently accurate to calculate the "mean surface temperature" and to use it as the mean radiant temperature. The mean surface temperature is found by multiplying the several areas by their respective temperatures, adding the products and dividing the resulting sum by the sum of the areas of the surface,



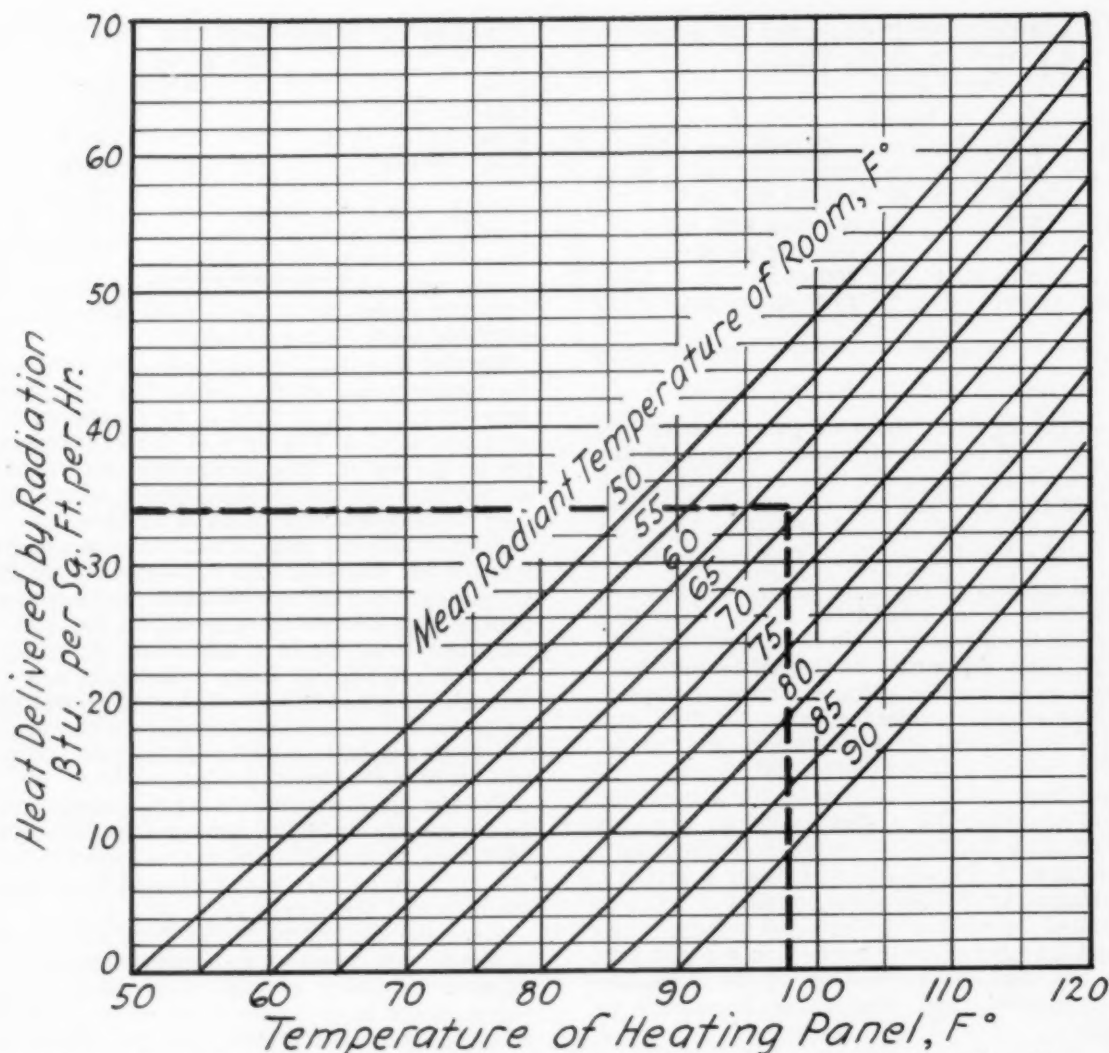


Fig. 5 - Heat Delivered by Radiation to Room by Panel

as shown in Table 2. In this example, the mean radiant temperature is 63.3 F.

4. Determine the necessary ceiling panel temperature.

The heat loss of the room (Table 1) is 14,550 Btu. per hr. When the ceiling is used as the heating panel, about 30 per cent of the heat is delivered by convection and about 70 per cent by radiation; hence, in this example the ceiling must radiate energy at the rate of $0.70 \times 14,550$ or 10,185 Btu. per hr. or $10,185/300$ or 33.95 Btu. per hr. per sq. ft. over and above the energy radiated to it by the floor and walls.

When two surfaces of infinite size are parallel, the exchange of radiated energy between the two is with

sufficient accuracy $0.156 \left[\left(\frac{K_1}{100} \right)^4 - \left(\frac{K_2}{100} \right)^4 \right]$ Btu. per sq. ft.

When a space like the room shown in Fig. 6 is inclosed by six surfaces it is sufficiently accurate to assume that the exchange of radiated energy between any one of the six surfaces and the remaining five surfaces may be calculated by the same formula.

Mean Radiant Temp. Chart

In the present example, the ceiling is to radiate energy at the rate of $10,185/300$ or 33.95 Btu. per hr.

per sq. ft. The absolute mean temperature of the floor and walls (K_2) is $63.3 + 460$ or 523.3. By substituting these values in the formula, K_1 is found to be 97.7 F.

Instead of calculating the temperature, it can be taken directly from Fig. 5 as follows. Find 34 on the left margin, move horizontally to the 63 mean radiant temperature line and from there vertically to the lower margin and read about 97 or 98 F. as the required ceiling temperature.

5. Determine the mean temperature of the air in the space above the ceiling through which the warm air flows so that the ceiling surface temperature may be 98 F.

This temperature evidently depends upon the quantity of heat which must flow from the duct to the ceiling and upon the resistance to the flow of that quantity of heat. In this example, heat must flow through the ceiling at the rate of 34 (33.95) Btu. per hr. per sq. ft. If the ceiling is constructed of $\frac{3}{4}$ in. plaster on metal lath, its resistance would be 0.23; the resistance of the film of air attached to the ceiling will vary with the velocity of the air; for quiescent air, the resistance is 0.61; for moving air, it is less; if 0.61 is used as the resistance, the error will be on the safe side; in that case the total resist-

(Continued on page 212)

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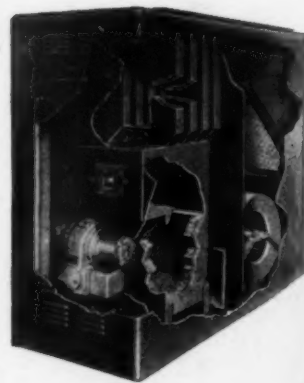
Our job, as a manufacturer of home-comfort equipment, is to help the Independent Furnace Dealer in all phases of his business. We intend to give our full cooperation, support and protection to the Independent Dealers handling the Premier line. We intend to give these dealers the best and most complete line of home-comfort equipment we have ever produced.

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PREMIER FURNACE CO., Dowagiac, Michigan



Typical one and two-family houses in Kingsbury, Indiana—most never used—which were taken apart and moved to Ottawa, Illinois, with all their equipment.

Houses Follow the Workers

National Housing Agency, through several divisions, has inaugurated a program of research designed to determine whether dormitory and multi-family houses can, after the war, be taken apart and reassembled into single family houses, barns, farm buildings, etc. There is already under way a program of dismantling and re-erecting single family houses elsewhere. This article describes how heating plants are moved with the houses.

IN THE January, 1943, issue, *AMERICAN ARTISAN* described the installation of winter air conditioning systems in the pre-fabricated war worker houses in Kingsbury, Ind., where more than 3,000 such houses were erected and all three-bedroom units were equipped with central heating systems.

As most readers are aware, there is now a program under way to dismantle these war worker houses where they are no longer needed and to ship them, with all their equipment, to other communities where housing is required.

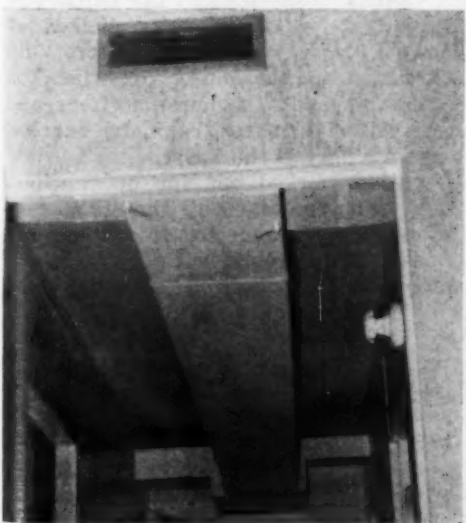
From the Kingsbury project several hundred houses have been or will be moved to numerous cities throughout the middle west.

With the thought in mind that this program can attain large proportions after the war and that many contractors may have a chance to take down and re-

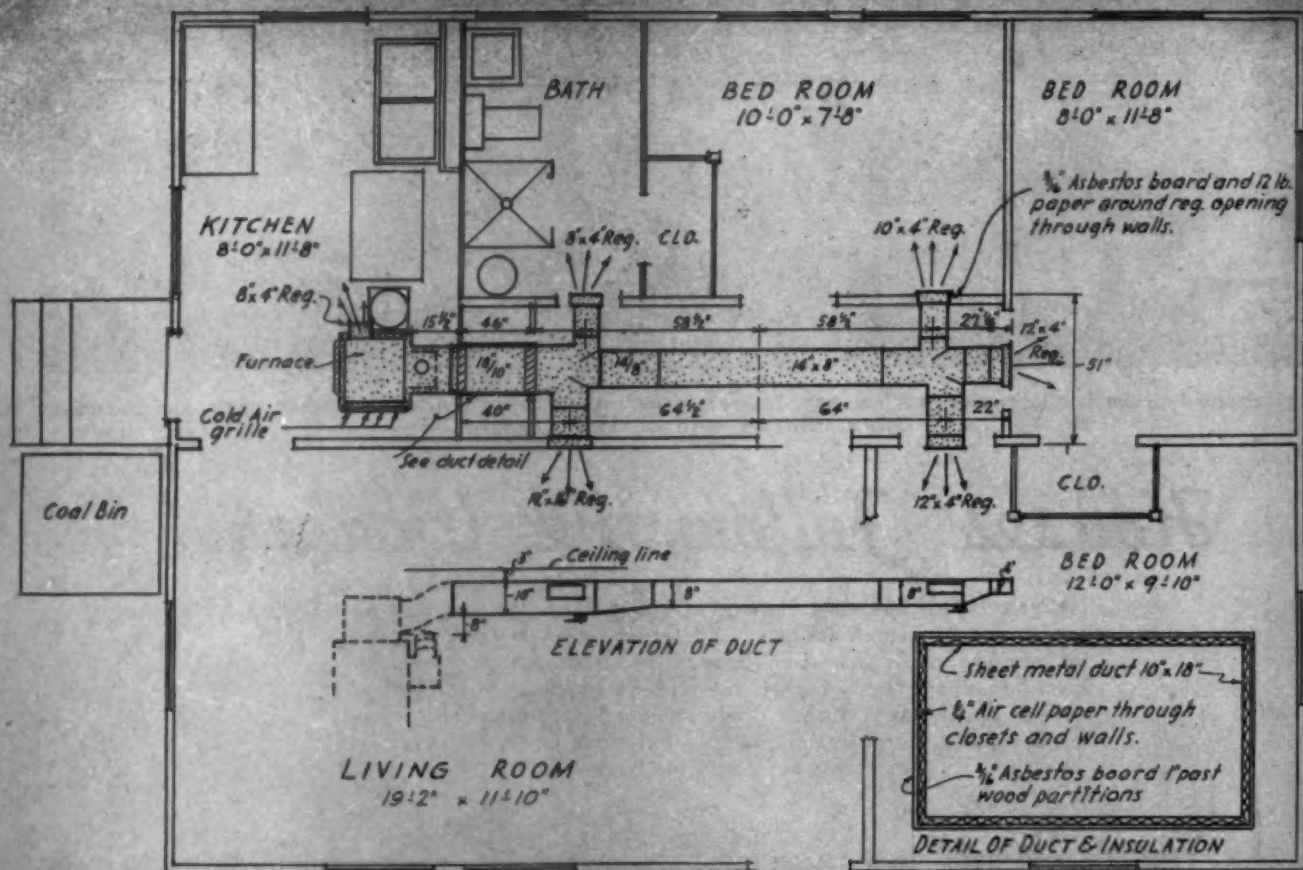
erect these central heating systems for pre-fabricated houses shifted to their community, the story of a typical procedure is here recorded in pictures and text as a guide for anyone interested.

This particular project involves the removal of 120 houses (100 with furnaces) from Kingsbury to Ottawa, Ill., a distance of about 175 miles by road. A general contractor—Sjostrom & Sons, Inc., of Rockford, Ill.—took the general contract for the dismantling and re-erection. A heating sub-contractor—Johnson Sheet Metal Works, East Moline, Ill.—dismantled the furnaces and the Vitroliner stacks for the furnace and the water heaters, trucked the equipment to Ottawa and re-erected the equipment.

The best way to explain the procedure is chronologically, but first it should be explained that the same men worked in Kingsbury and in Ottawa with the



Left—A duct line through the hall before dismantling showing the branches. Right—The duct system, plenum, heater flue pipe dismantled and marked ready for shipment to the house's new location. Each piece carries the number of the house.



FLOOR PLAN

Floor and heating plan of one of the houses moved. The simple distribution system consists of two sections of trunk, five branches, a supply plenum and a takeoff. Note pipe connections handled as described in the report.

work so divided and scheduled that as the general contractor designated certain houses to be moved, the Johnson crew dismantled the furnace, as will be explained, and stacked the equipment inside the house in Kingsbury. Usually several houses were dismantled during one given trip to Kingsbury. Then, when the Johnson trailer van arrived, the furnaces were slid by dolly into the van and the piping and accessories were likewise loaded and the van load was transferred to Ottawa. Three men could load one heating system in 45 minutes, but unloading took about one hour. Thus no heating equipment was exposed to the elements.

In Ottawa the Johnson company rented a storeroom with dock height loading platform and the van load was moved into the storeroom. As the general contractor re-erected the houses in Ottawa, the piping which came out of the house at Kingsbury, plus one furnace taken at random, was taken out of the storeroom and delivered to the house when the time was appropriate. In this manner the equipment was always out of the weather.

It was found most economical of space to fill a van with furnaces alone or with piping alone and this was adhered to except when there was fewer than a load of furnaces—then the van load also included duct work and accessories. Usually one van could haul about 22 to 24 furnaces in one load. The metal duct work, Vitroliner stacks, collars, controls, etc., for 23 furnaces also made up just about one vanload.

Dismantling Routine

To begin with the dismantling, two mechanics or one mechanic and a laborer constituted a dismantling crew. These two men in two hours could dismantle the furnace and duct work and pile it in the house ready to load on the truck. As each piece of duct work was taken down (but not the furnace) the number of the house (No. 437, for instance) was chalked or painted on each piece. The general contractor did likewise on each section of the house. So, when the house went up once more, all the house sections and all the equipment except furnaces, cabinets, heaters, etc., were once again a part of the house.

Here is the routine worked out for dismantling. First, all the registers were taken off the stubs. Second, the stub branch was disconnected from the main. Some branches had a stub integral with the main and the connection about half way between the side of the main and the partition. In this case, the joint was opened by taking off the cleats. In some other houses the connection was right at the side of the main and the branch was one-piece unit. Third, the branches were pulled out through the partition and marked. Fourth, the main was uncleated at its section joint—all mains were erected originally as two sections—and the register end was laid on the floor. Then the main was uncleated from the furnace plenum and the furnace end of the main was pulled out through the partition and laid on the floor. The hangers were taken down with the main sections. Last, the plenum



Left — Far end of trunk is slid into partition opening for end branch by one man and left dangling. Right — Furnace end of trunk is pushed through closet and partition into furnace room; then two sections are put together with S-cleats and drive cleats.



was unscrewed from the furnace casing (sheet metal screws). The old cleats were thrown away.

To dismantle the Vitroliner smoke stacks, the top, outside section was taken down. Then one man crawled into the attic and removed the insulation and passed it through the skuttle into the house. Then the stack was separated at the joint in the attic space and the middle section was handed down. Finally, the lower section was disconnected from the smoke pipe and taken off the supporting shelf. No attempt was made

to mark the Vitroliner or to put the same pieces back on the same heater.

The erection procedure begins, as described, with the delivery from the Ottawa storeroom of one furnace and the Vitroliner smoke pipe and new insulation plus the duct work which came out of the house in Kingsbury. When it came time to re-erect the system, here is what transpired. First, the furnace was dollied into the heater room to get it out of the way (most furnaces were delivered in the front door). No attempt was made to place the furnace in its final position. Second, two men or even one man picked up the register end of the main duct (see picture) and

Left — Branch is shoved through partition from room into hall. If too long, end is snipped off. Right — Then one mechanic in room and another in hall cleat branch to main. 30 - gauge iron makes two men practically necessary.





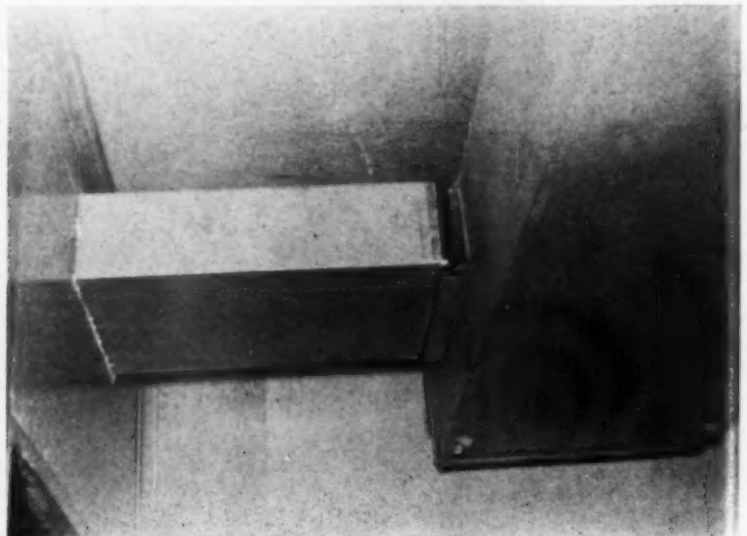
The supply plenum—as a unit—is laid on casing and pushed around until the takeoff section can be cleated to the main sticking through partition and cleated to plenum. Then furnace is moved around until flange of plenum can be screwed to casing.

shoved the end branch through the hall partition. The section just hung in the air on the branch stuck through the partition. Third, the furnace end of the main was shoved through the furnace room partition and left hanging in the hole. Fourth, working each on a step ladder, each man in the crew jockeyed a main section until one of the cleats which had been put on the top and bottom of the register end section could be slipped home, joining the two sections together. Then the other cleat was slipped together and, finally, the two side drive cleats were hammered home to pull the two sections together and line them up. Fifth, in turn, each branch was shoved through the partition by one man while the second man at the main jockeyed the branch around until the connection could be made. (The next paragraph gives some notes on this stage of the procedure.) Sixth, registers were put back in place, hammering the end of the branch if necessary to align the end of the branch with the partition. Seventh, the plenum and the takeoff were joined on

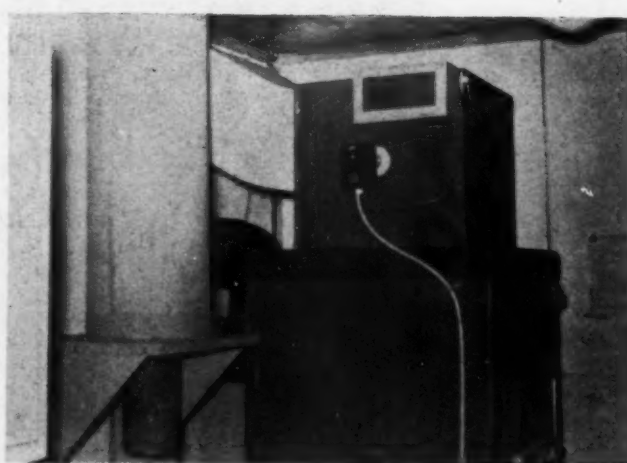
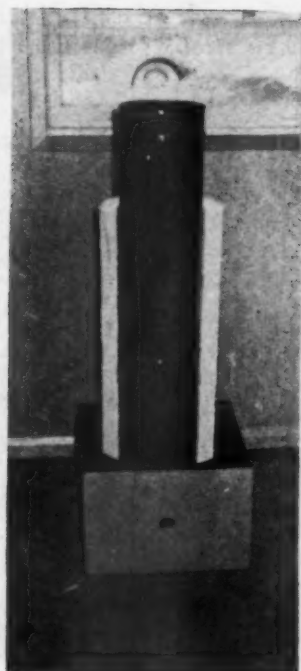
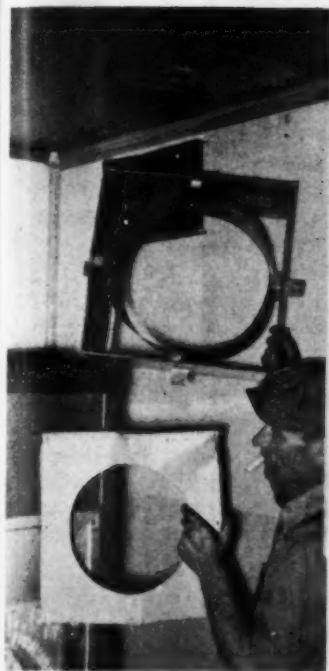
the floor and cleated to the main sticking through the partition. Eighth, the furnace was shoved around the floor until the connection between the plenum and the top of the casing could be made. Two men (usually a mechanic and a strong laborer) working under the foreman, who directed the work, could re-erect the furnace, the duct work, and all the accessories in three hours.

Going back to the connection of the branches with the main, it will be noted in two photos that sometimes the branch failed to come far enough through the partition to place the register and usually in this case the branch on the opposite side stuck out into the room. This was remedied by shifting the main. But in some cases both branches were short or both would be long, or most often one branch would be just right and one would be too long. The remedy was to have several widths of cleats to let one branch stick out farther and then cut off the long branch.

In cases where the main was too long, the register



Left—This branch is too long because of variation in house dimensions (see text), so end is snipped off flush with partition. Right—This branch is too short (same reason) so an extra wide cleat is used to fill the gap. Usually a short and a long branch opposed one another.



Left—Foreman holds old (lower) and new (upper) Vitroliner collars where flue passes through ceiling. New collar gives added fire protection. New collar also allows thicker insulation. Right—Plenum and takeoff and flue completed in new location.

branch at the end was cut off. But in some cases the main was short and here again a set of wide cleats had to be used. In some cases the furnace could be shifted enough to compensate. It took considerable wrestling in some houses to adjust the duct work.

The reason why ducts did not always fit as originally is that the house might have first been erected with all sections tightly put together. Then, in re-erection the sections might be separated a quarter of an inch or slightly more. With six sections in the floor and one-quarter inch between sections, the house might end up as much as two to three inches longer than originally. Practically every house varied at least three-quarter inch from its original dimensions. And, of course, the same thing could and did happen in the front to back dimension, for the same reason.

Flue Insulation

The Vitroliner smoke stacks were re-erected by placing the lowest section on the shelf. Then the middle section was lowered through the ceiling and slipped together. Then the top section was shoved up through the roof and lowered to slip onto the middle section. The outside section, with the rain hood, was erected last from the roof. When complete, the insulation was put on. One man handled the stacks and it usually took him about 1½ hours to put the stack together and connect it to the furnace smoke pipe. It took one man about two hours to apply the insulation.

One photo shows the old and the new collars through which the smoke pipe passes through the ceiling. The old collar was solid metal; the new collar is a square box with a round inside in which the Vitroliner and the insulation is held away from the square outside by an air space. This new collar is an added precaution against fires. The old insulation (1 inch thick) was discarded and new 1½ inch insulation was used. A carpenter spent about 2½ hours cutting the necessary new hole and beading the hole for the new collar.

The last operation was to screw the draft door-check damper regulator back on the casing, put the

pulleys in place and connect the chain. The pulleys went back in the same holes from which they came, unless the furnace had been shifted.

Some of these houses re-erected in Ottawa now have a coal-fired water heater set and connected by the plumber, but Johnson installed a new Vitroliner stack and insulation.

Cost Results

The Johnson company estimates that the furnace and duct work in place cost just about one-half the original cost of the duct work fabricated and installed. Re-erection figures just about the same as original erection, but taking down the duct work and hauling was considerably less than one-half of the cost of original fabrication.

When the work is finished, the furnace is practically identical with original installation even to use of old holes for pulley screws. Furnaces did not go back in same house.





Surface Combustion aircraft heater; 100,000 Btu capacity; weight 28 pounds; two-thirds of a cubic foot in size; fuel gasoline; air velocity through heater 5,000 fpm; bonnet air temperature 250-350 degrees.

HIGH UP in the list of "miracle" equipment American home owners seem to expect after the war is a heating unit which, for lack of a better term, we might call a "closet shelf furnace," meaning thereby a furnace which can be stowed away behind last summer's old straw hat on a closet shelf.

Publicity, unfortunately premature and striving for sensationalism, has taken the heaters, de-icers and engine warmers used in aircraft and predicated upon their truly sensational characteristics a postwar era with the home heating plant so small that it can be hidden away in a closet, or stowed in the attic, or even suspended between joists or studs to heat a single room or perhaps the entire house.

Such developments may come after the war but are not yet in sight, and no responsible manufacturer is yet in a position to promise such compact units and won't be until several ticklish problems are successfully solved.

All these units stem from wartime need for special use heating equipment—mostly for airplanes, where space and weight limitations require a tremendously high heat output from a small and light unit which can be installed in limited wing and body spaces in the crowded plane. The heater manufacturers have met these needs for war service, but the very characteristics which satisfy war use condemn these units for postwar domestic use—the following summary explains.

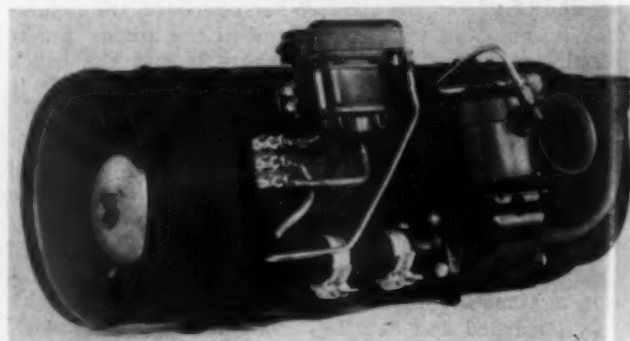
Fuel and Noise

First there is the problem of fuel. It is not feasible to carry two types of fuel in a plane, so these heaters must use the high octane (73-130) gasoline used by the plane's engines. This fuel is heavily leaded so the burner and the heater must operate at temperatures high enough to oxidize and carry away the lead in the flue gases. The rate of flame propagation using gasoline is rapid, so it is possible to burn large quantities of fuel in a small space. This explains the astounding capacities from these little units.

Next is the problem of noise. These small units rating 15,000 to 200,000 Btu. per hour must pass extremely large volumes of air over their heating surfaces in order to carry away the tremendous heat generated. So the air is passed at high velocities under pressure of the plane in flight or by pressure blowers, approaching 60-mile per hour velocities (5,000 fpm. compared with 800 fpm. in an ordinary furnace) and the resulting noise may be likened to an industrial size vacuum cleaner under full steam. Such a racket is noiseless in a plane with thousands of horsepower roaring outside the window, but in a home would drive the owner out into the backyard. And such noise cannot be deadened by usual methods of soundproofing, but can be overcome only by greatly increasing the size of the unit to bring air velocity down. Temperatures of the air coming off these units runs 250 to 350 degrees.

How Long Will They Last?

Third is the problem of life expectancy. The usual plane heater is, first of all, constantly serviced by



Stewart-Warner Corp. aircraft heater; 50,000 Btu capacity; weight approx. 17 pounds; 19x7 inches in size; fuel gasoline; 180 cfm at 2½ in.; maximum temperature rise in supply air 250 degrees.

skilled mechanics who give the heating system a going over every day. In spite of this attention the usual war plane and equipment does not expect more than 1,000 hours of life. Some heaters show signs of wear and tear after 100 hours of life. Contrast this to the usual home furnace, which is expected to perform for at least 20 years (86,400 hours for a six months heating season). Heavier, larger and less stressed materials and design are the answer.

What Will They Cost?

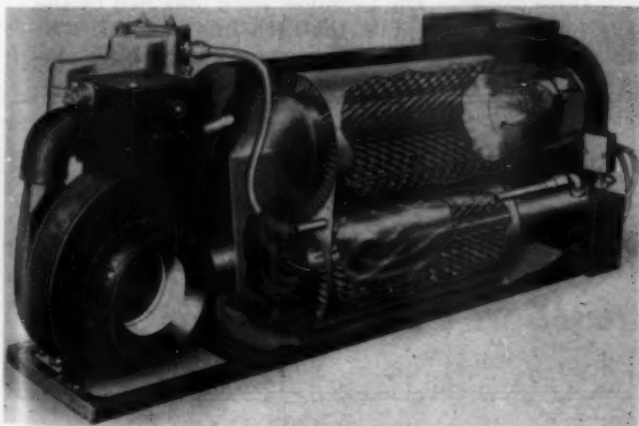
Finally, the cost. No figures are available on cost of plane heaters, but the construction shown in the photographs of typical units indicates precision workmanship, with expensive materials, so that on the basis of pound for pound of capacity at usable operating characteristics, these midget heaters are undoubtedly far beyond present costs of home heating equipment. Just how much this cost can be reduced is problematical—almost any change which reduces cost also, and in direct ratio, reduces the capacity



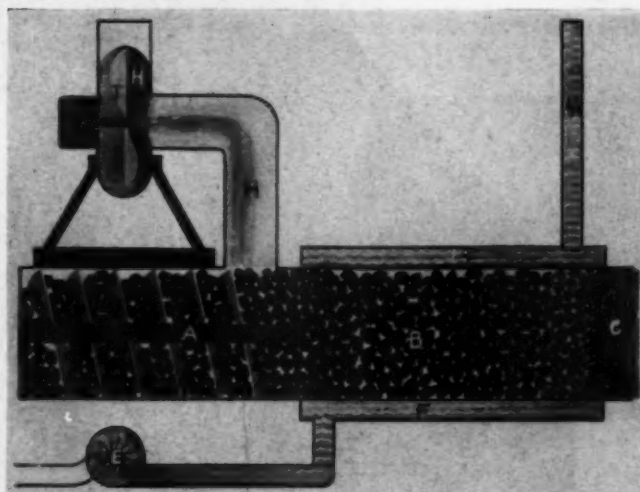
Borg-Warner Corp., Norge Heating & Conditioning Division portable, self-powered utility heater; 60,000 Btu capacity; 24x12x16 inches in size; fuel gasoline; weight 45 pounds; 300 cfm at .5 in.; temperature rise 175 degrees.

so that the manufacturer ends up with a unit which Btu for Btu is not much different in size from modern furnaces.

So we are left in our thinking with this fact. These airplane heaters have introduced the use of a new fuel (gasoline) and new combustion principles—can we salvage these advances for our postwar home heating furnaces?



Anchor Post Fence Co., Fluid Heat Division aircraft heater; 90,000 Btu capacity; weight, approximately 25 pounds; fuel gasoline.



Anthracite Industries Laboratory "Anthratube" coal burning principle; revolving worm (A) introduces coal automatically into tube; coal burns in center of tube (B); ash is discharged at end (C); draft is provided by air which enters at ash end of tube (D) and is drawn through the incoming coal by fan (J) in smoke pipe (H); water is circulated around tube by pump (E) and flows to radiators through pipe (G).

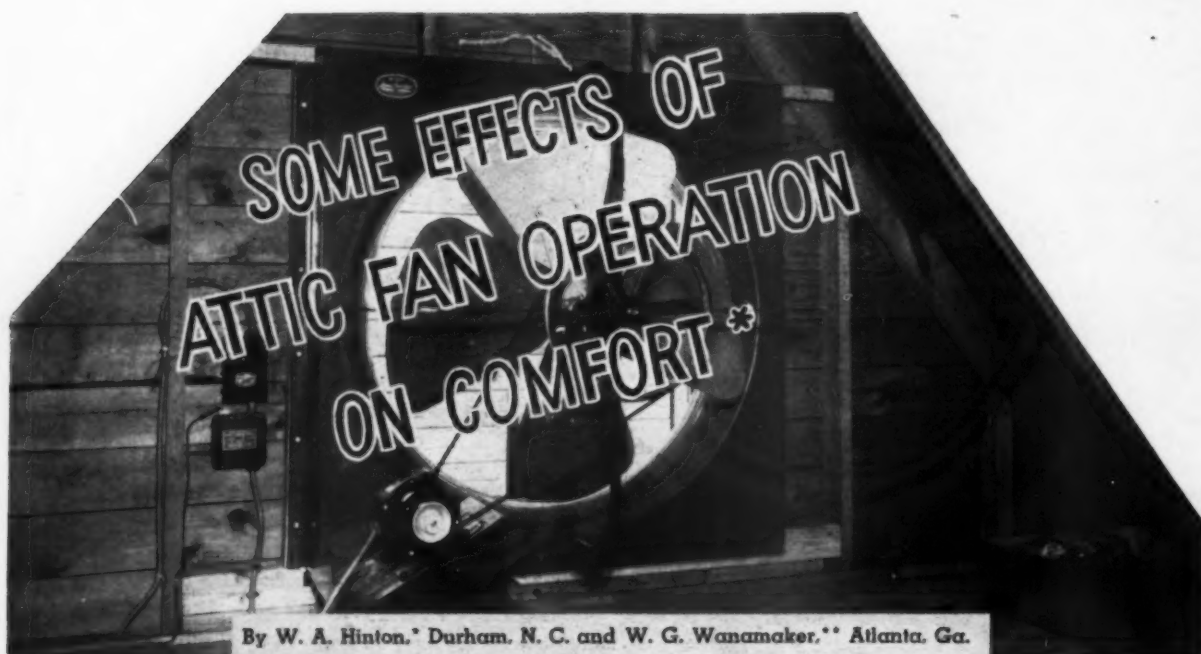
As to the fuel it is not yet certain that the public will accept nor city officials and insurance companies approve gasoline as a fuel or the piping of oil to individual units and the carrying away of exhaust fumes directly to the outdoors without chimneys. Most of the manufacturers are experimenting with or will experiment with oil and gas as a fuel in heaters stemming from airplane heaters but most of the development work must wait the end of the war.

So the combustion principles remain as the logical development. But we should remember that the primary reason for these new principles is to save space and weight and in house heating space and weight are not nearly so important as our "dreamers" imagine. We already have furnaces rated at 60,000 Btu. taking a space of 26 by 26 inches on the floor and around 500 pounds weight. Surely in most houses there will be space for units of this size—even larger—so while space and weight are interesting, they are not the controlling factor. What the merits will be of furnaces in attics using a vent instead of a chimney, or unit heaters for a single room without even a vent, remains for the public to decide. Since most surveys show owners demanding a fireplace, the elimination of a chimney is a rather vague advantage.

"Closet-Shelf" Coal Burners

This brief summary of "closet shelf furnaces" is not complete without some mention of the currently much publicized "Anthratube" a new principle of burning anthracite coal using a concentrated, fast burning fire of great intensity, making possible a heater about 2 by 3 feet in size burning 50 to 60 pounds of fuel per square foot per hour and liberating more than 500,000 Btu. per cubic foot. But this equipment, so we are told, while tested in the laboratory, is not yet incorporated in equipment available to the consumer. The mechanism is shown in an illustration and is a tube six to eight inches in diameter and approximately 18 inches long. Anthracite is fed into the tube automatically; the coal burns in the center of the tube under forced draft; ash is discharged from the other end. What will come of this

(Continued on page 221)



TO MEASURE the effect of attic fan operation on comfort, an investigation was started by the Atlanta Chapter and the Committee on Research of the ASHVE in cooperation with the State Engineering Experiment Station at the Georgia School of Technology. In a former report the results obtained in the summer of 1941 were presented to the society.

The data gathered came from tests conducted in two practically identical houses, one of which was equipped with an attic fan. Findings were reported on the effect of various air changes per hour on air temperature. Wet-bulb temperatures were noted and a few measurements of air velocity were made, but these data were so meager that they were not included in the report. It was decided to extend the investigation during the summer of 1942; the additional results are reported here.

Test Equipment

The two houses used during the summer of 1941 were not available for further use; consequently another Atlanta house was selected. It was a single story frame structure without a basement. The windows were double-hung wood sash, without awnings. The interior walls and ceilings were of wood, lath, and plaster. Fig. 1 is a floor plan of this house, showing the location of test instruments.

The fan used was a four bladed axial or propeller type, 35 in. in diameter. It was rated to deliver 10,000 cfm. at a speed of 350 rpm. when operating against a static pressure of 0.01 in. of water. This fan was installed in the house in such a manner as to draw air through an opening in the ceiling of Room IV. The fan discharged air into the attic space. The gross area of the opening in the ceiling was 17.5 sq. ft. and was covered by an expanded metal grille hav-

ing 70 per cent free area. The net areas of openings by which air left the attic totaled 25 sq. ft.

The fan was turned on during afternoons at times ranging from 3 to 5 p.m. and was turned off at approximately 9 a. m. the following morning. (Had a time clock been available the fan would have been turned off somewhat earlier in the morning). During periods when the fan was operating the windows were kept open and the air temperatures were obtained from the charts of the recording pyrometer.

The procedure used for obtaining mean radiant temperatures was to place the globe in the center of the room 30 in. above the floor and to record temperature inside the globe, air temperature outside of the globe not more than one foot from the globe. Air velocity at the same level as the globe, and not more than one foot from it, was recorded. Most of these measurements were made with the fan in operation, since it was desired to determine the effect of fan operation on mean radiant temperature.

The air movement and distribution was studied by using two or three procedures, each of which was somewhat similar to the others. One procedure was to put the fan in operation and determine average velocities at open doors and windows with the four-inch anemometer. The averages were obtained by the usual method of dividing the area into stations, taking one-minute readings of anemometer at each sta-

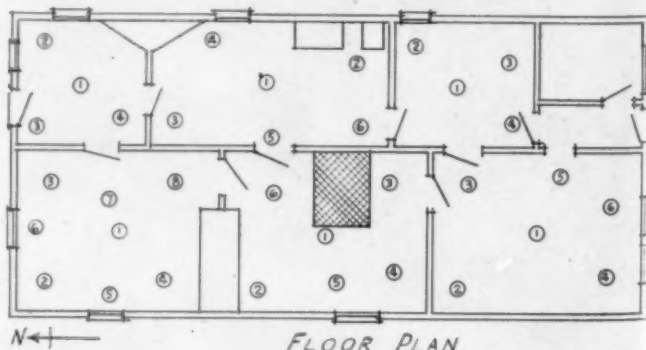


Fig. 1—Location of instruments: (+) air temperature measuring station; (O) air velocity measuring station; (1) instrument table; (R) recording pyrometer.

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¹Exponent numerals refer to Bibliography.

Note: Published by permission of the Director, State Engineering Experiment Station.

²Extracted by permission from paper presented at Semi-annual meeting of ASH&VE, at Grand Rapids, Mich., June, 1944 and published in ASH&VE Journal Section of Heating, Piping & Air Conditioning, May, 1944.

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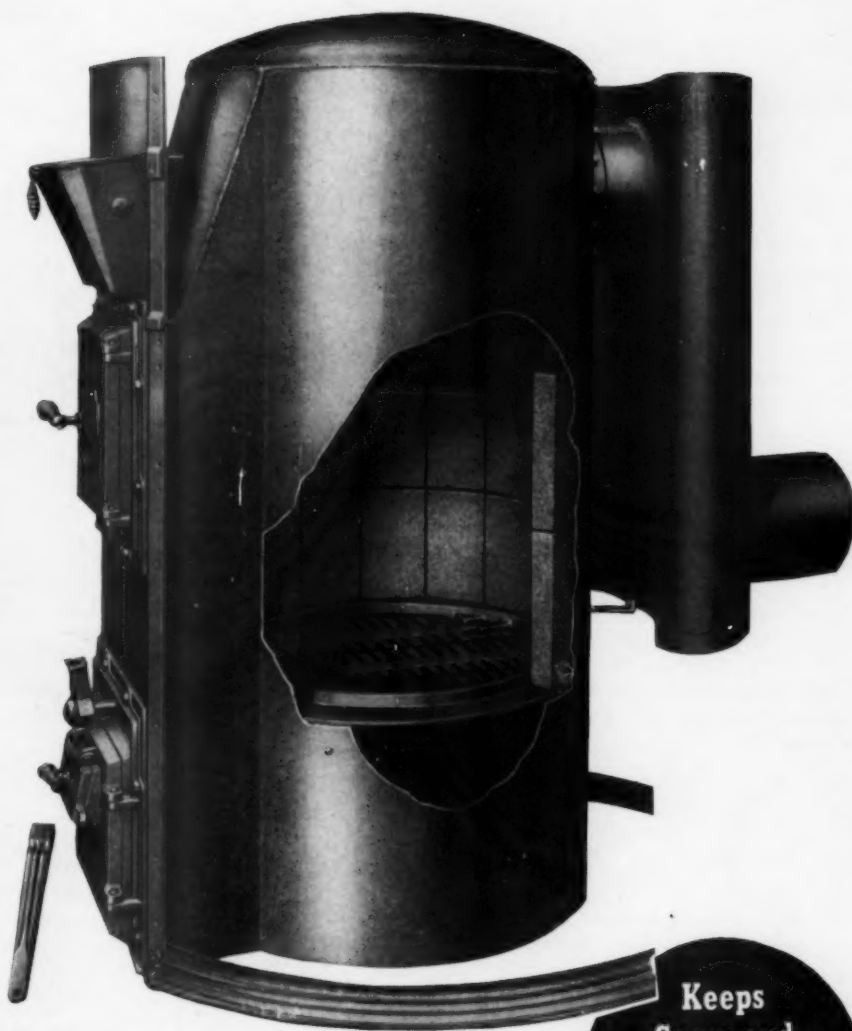
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By E. L. PAYNE, President

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For more than two years, our Company has concentrated on war production. But as we enter the reconversion period, we are prepared to resume our peacetime pursuits after many months of post-war planning, better equipped for our job than ever before.

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Working closely with the aviation industry and with Army and Navy technicians, we have profited by technological advancement as stimulated by the war... "compressing," as someone said, "ten years' progress into two."

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However, do not expect immediate, radical changes in our products. Evolutionary, yes; revolutionary, no! There has been altogether too much loose talk about miracles to be wrought on "V-Day plus 1." Early post-war PAYNE models will be patterned after our latest pre-war models, not radically changed. In fact, the major improvements we've already planned will be gradual.

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A modern PAYNE ZONE-CONDITIONING installation provides healthful, circulated warmth from appliances invariably and properly vented. Also in forced-air installations, it includes winter air-conditioning plus cooling summer ventilation adequate for comfort in all but extreme heat.

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PAYNEHEAT pioneered the theory and practice of "Unit" or "Zone" heating now pioneers its further evolution under the new name, ZONE CONDITIONING, and with added knowledge and facilities that assure continued leadership. Our name has always stood for advanced design, precision workmanship, sound engineering and enduring quality. This heritage will be our guide to future progress in what we all hope will be a new and better world.

E. L. PAYNE



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FURNACE & SUPPLY CO., INC., BEVERLY HILLS, CALIFORNIA

Table 1—Average Velocities at Windows and Doors

Room No.	I	II	III	IV	V	VI
Velocity at Windows, Ft./Min.	144	63	30	291	188	48
Front Outside Door—30 Ft./Min.	Back Outside Door—22 Ft./Min.					
Fan on—all windows and doors open	—N-North W-West					

Table 2—Distribution of Air Flow

Room No.	VOLUME OF ROOM	AIR FLOW	AIR FLOW	AIR
	CU. FT.	CFM	PER CENT TOTAL	CHANGES PER HOUR
I	894	1595	22.8	107
II	1904	635	9.1	20
III	1664	1965	28.2	71
IV	1904	1440	20.6	45
V	954	605	8.7	38
VI	2064	745	10.6	27
Total	9384	6985	100.0	45 Avg.

Above values based on air entering from outside.

tion, then adding the velocities, and dividing by the number of stations to obtain the average value.

The second procedure was to have the fan in operation and determine air velocity by means of a heated thermocouple anemometer at each station indicated on Fig. 1. During these tests the windows and doors of all rooms were opened.

The third procedure was the same as the second except that certain rooms were closed and others left open. The air velocity was then measured at all the stations in the rooms that were left open. In this procedure there were several possible combinations of rooms that could be left open. Obviously, Room IV, in which the fan grille was located, had to remain open in all cases. The following combinations were studied:

Results and Discussion

Air temperatures were recorded on 15 days. The curves shown in Fig. 2 are typical of the results obtained. These curves show the variation of both inside and outside air temperature over a 24-hour period. During this test the capacity of the fan was 45 air changes per hour based on the total volume of the house; all rooms were open. These curves confirm the results previously obtained in the earlier investigation. It will be noted that while the fan was operating the difference between the inside and outside air temperature did not exceed three degrees Fahrenheit. Most of the time the temperature differential was not over two degrees Fahrenheit.

The results of the tests in which air movement and distribution were studied are shown in Tables 1, 2, and 3. Although the fan intake grille was located near the center of the house as shown in Fig. 1, there were large variations in air velocities and in quantities of air entering the several windows of the house. Table

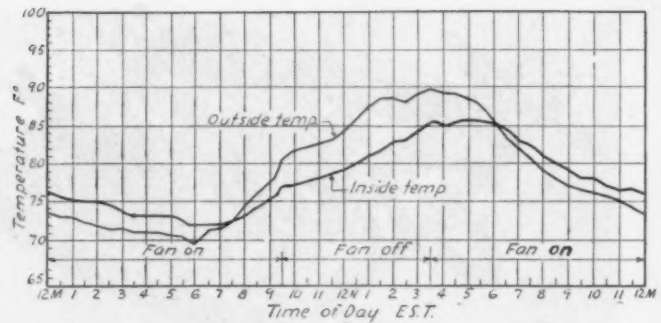


Fig. 2—Relation between the time and inside and outside temperatures, 45 air changes per hour, 9/18/42.

1 shows the average velocity at each door and window when the fan was in operation. It may be seen that in Room II the air velocity was 63 fpm. at the north window, but was only 20 fpm. at the west window. It is also interesting to note that the highest velocity was not obtained at the window of Room IV, the room in which the fan grille was located, but at the window of Room III.

The distribution of air in terms of cubic feet per minute and air changes per hour is given in Table 2. These quantities are based on air actually entering the rooms from the outside and do not include any air that may have passed through one room and then into another. The largest volume of air entered through the window of Room III, while the next largest entered through Room I. From this table it can be seen that the air changes per hour varied from 20 for Room II to 107 for Room I.

The differences in air volumes and air changes per hour were due, in part, to the resistance to air flow offered by various rooms. In general those rooms farther from the fan inlet would offer greater resistance and consequently have less air flow through them. Another factor that influenced the air entering various rooms was that a hill directly west and to the south of the test house sheltered the windows of Rooms II and IV from wind coming from that direction. The windows of Rooms I, III, and V were more favorably exposed to wind since the space east of the house was vacant; the nearest building was 200 ft. away. A house located 40 ft. south of the test house affected somewhat the amount of air entering the window of Room VI. In comparing air changes per hour the volumes of the rooms should be kept in mind. Since small rooms often have windows as large as the other

(Continued on page 214)

Table 3—Air Velocities Feet Per Minute

Room No.	I				II								III					
STATION No.	1	2	3	4	1	2	3	4	5	6	7	8	1	2	3	4	5	6
Rooms Open: All	165	42	112	56	45	23	18	27	73	88	52	45	156	37	59	89	77	27
Rooms Open: II-IV	158	16	18	47	166	145	82	82	..	..	..	..	..	..
Rooms Open: IV-VI	30	..	44	240	162	37
Rooms Open: III-IV	144	16	27	43	122	97	61	61	..	..	..	..	..	..
Rooms Open: II-IV-VI	122	52	159	317	243	37
Rooms Open: III-IV-V
Rooms Open: IV-V-VI
Rooms Open: I-III-IV	51	36	266	79	165	36

Room No.	IV						V				VI					
STATION No.	1	2	3	4	5	6	1	2	3	4	1	2	3	4	5	6
Rooms Open: All	104	81	104	68	104	104	44	76	19	45	45	43	43	28	52	36
Rooms Open: II-IV	228	28	156	188	107	..	..	..	..	..	157	84	41	157	66	240
Rooms Open: IV-VI	354	57	210	28	210	28	..	..	..	..	..	..	..	..	..	..
Rooms Open: III-IV	88	34	35	35	226	51	..	..	..	..	..	..	..	..	..	..
Rooms Open: II-IV-VI	..	..	..	..	..	..	..	..	..	..	124	35	35	70	125	125
Rooms Open: III-IV-V	57	75	41	46	105	181	118	81	39	65	..	..	..	..	..	..
Rooms Open: IV-V-VI	167	85	300	85	230	164	81	115	43	141	32	40	81	32	46	32
Rooms Open: I-III-IV	83	40	48	48	88	111	..	..	..	..	..	..	..	..	..	..

Velocities measured with heated thermocouple anemometers—30" above floor.

Artisan's Blueprint of POST-WAR Heating

"Solar" House Heated by Floor Type Radiant (Panel) Warm Air

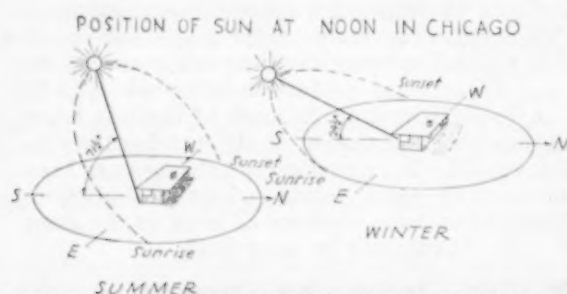
IF SOME of the recently published surveys of postwar home preferences are acceptable, there are going to be a great many houses heated by the "panel" system—there will be no basement and no attic and the interior will be "functional," meaning thereby multi-use rooms. Materials, will not be hidden behind wall paper and ease of maintenance will be of paramount importance.

Also high up in the scale of interest value is the "solar" house, which may be roughly described as a structure strung out so that as many rooms as possible face south; with the south wall of all rooms as nearly all-glass as possible; and with a roof projecting out far enough to cut off the direct rays of the sun in summertime but admitting sunlight to the rooms in winter. The basic idea is to admit sunlight and solar heat in winter to augment the heating plant.

The accompanying diagrams and photographs show a solar house panel heated with positively circulated warm air. This house was designed and built under the supervision of George Fred Keck, a Chicago architect who has been a pioneer in the solar house development and has been experimenting for several years with all types of radiant floor heating.

Describing the house and the heating system, Mr. Keck says:

"This little house is in the medium price class. The house is basementless. Today, for professional people living in urban communities, large storage basements are superfluous, therefore they can be omitted. The necessary services, aside from storage, that the basement affords, such as housing of the utilities and some storage, can be made available on the ground floor, where it is more easily ventilated, convenient



Front exterior of a typical "solar" house designed and built by architect Keck. Diagram shows how sunlight enters house in winter when sun is low and how overhanging roofs keeps sunlight out in summer when sun is high. Note in photo (taken in autumn) sunlight enters lower half of windows; in winter sun shines through full windows.



End view of forced warm air furnace described in text. Warm air leaves plenum through two mains and enters under-floor main tile through house center. Returns are brought across floor diagonally (see plan, page 152) and are brought into T-shaped return air header on the floor.

and pleasant to work in.

"With heating of the type described herewith—a floor type radiant heating system—the basement is not needed any more because the floor in the winter is warm. As a matter of fact, in today's building construction, a basement is erroneously supposed to keep a floor warm. Modern, insulated heat generating units are so efficient that they don't radiate enough heat to warm a basement and heat must be introduced in basements to keep them warm. Therefore, from that point of view a basement is a liability unless it is in constant use. So, in the contemporary house it is reasonable to suppose that more and more basements will be omitted and their services brought above ground, as is shown in the plan for this house.

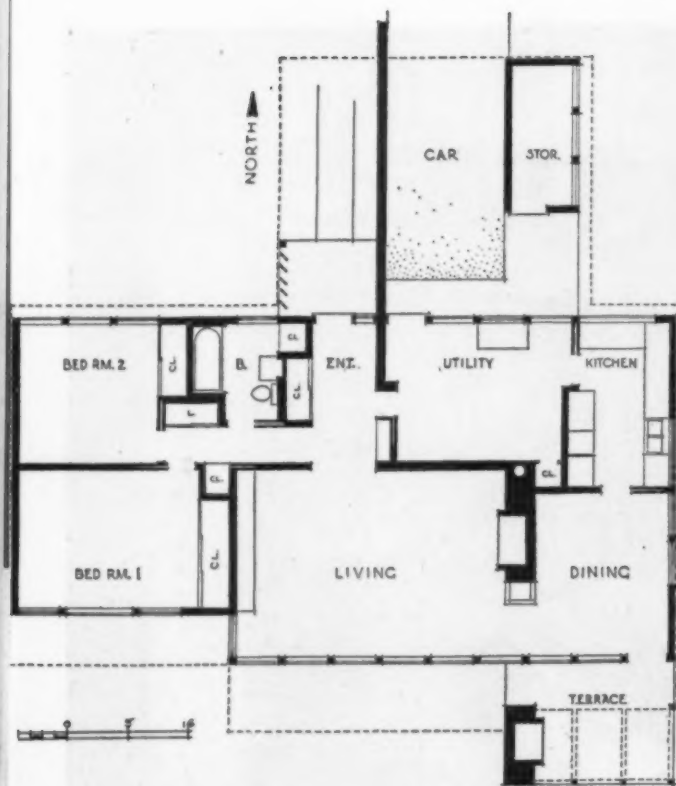
Problem of Cold Floors

"With the omission of basements in houses comes the problem of keeping the floor warm in the winter-time in the colder sections of the country. If the floor can be made a radiator of one kind or another, large enough so that the temperature in extremely cold weather is never more than 85 or at the most 88 degrees Fahrenheit, then the problem of the cold floor is overcome. In a considerable number of houses of

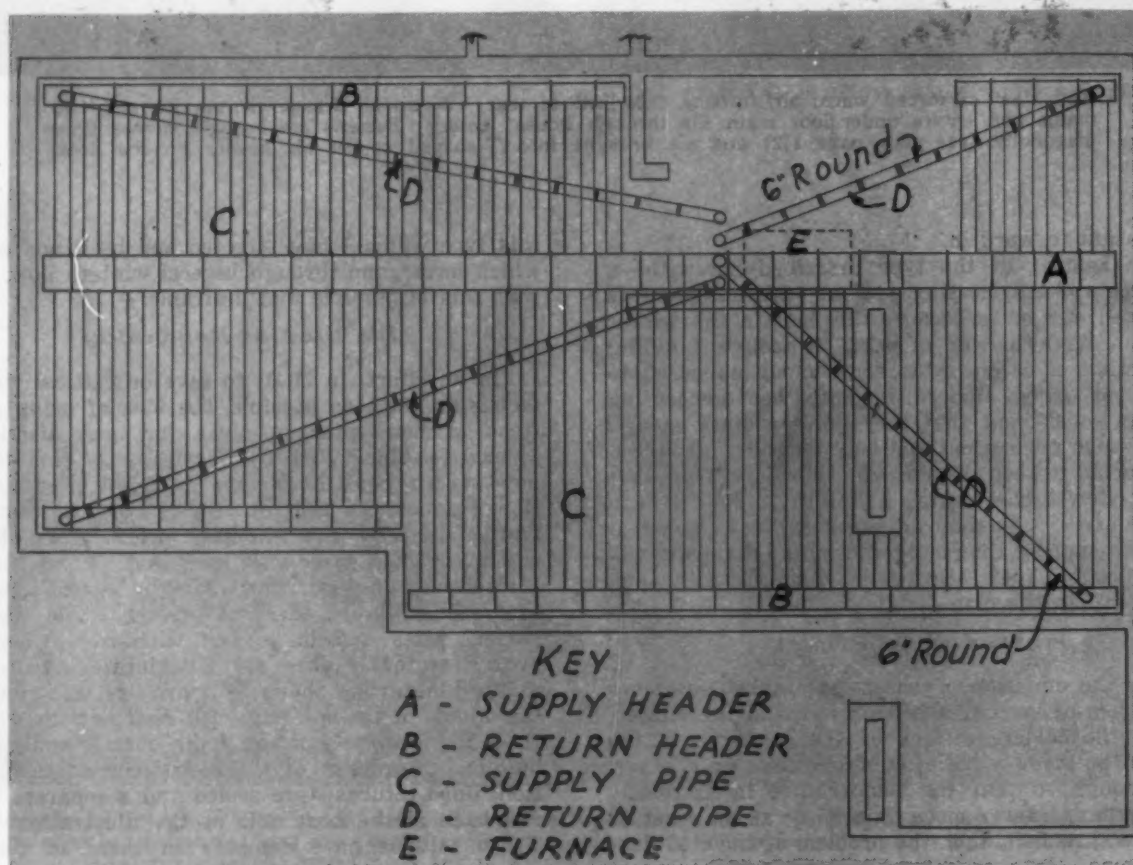
this type which I have erected and built and each of which have gone through several winters now, I find that this is possible and desirable.

Tile Used As Non-Critical

"In an effort, in 1941, to save on critical war materials as much as possible, the idea of using air instead of hot water in pipes for heat distribution seemed feasible. With the feasibility of this development as a type of heat came the problem of distribution, balance and control. First came the matter of finding material that will work properly and through which air could pass, something that was on the market and could be used immediately. Vitrified clay flue tiles seemed to be the best answer. Tile comes in various sizes and in contact with the ground and ground water it does not deteriorate. Accordingly, as the illustration shows, a trunk line was run down the middle of the building with distribution two ways from it. Returns ran along the outside walls of the building. For each of the rooms and at each partition, lined returns were sealed and a separate return run back to the heat unit as the illustration shows. These returns have dampers in them so that the volume of air can be controlled for each room by such



Above—Floor plan of house on page 150. Below—Distribution system has one large central tile main (A), with parallel lines of tile (branches) (C) to heat the floor panel, and return headers (B) with return mains (D).



a damper. In this manner balance was achieved.

"A warm air furnace large enough to handle the heat loss in this house was installed, less humidity apparatus and filtering apparatus, since no air enters the house itself, but instead there is a complete circulating system under the floor of the house. Supply was taken from the top of the furnace and directed to the main supply duct. All of the returns were brought together at the furnace and connected at the return end of the furnace. The illustrations herewith indicate approximately how this was accomplished. An air thermostat was set at a convenient point in the house and the furnace controlled from this air thermostat. The system works exceedingly well and has been in operation through two Chicago winters.

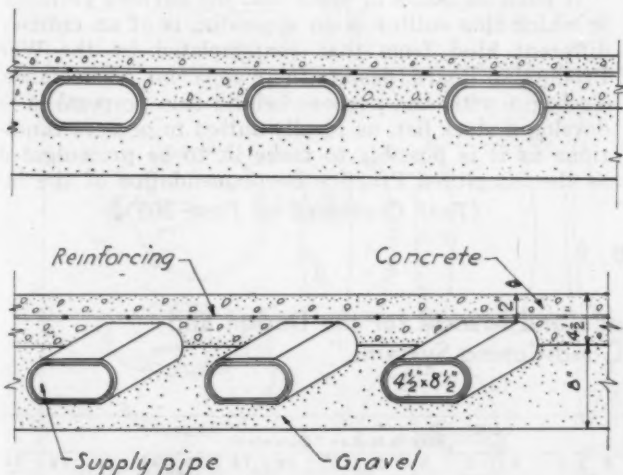
"Solar" Heating Effect

"In addition to the heating system this house has been developed so that three rooms of the house—one of the bedrooms, living room and the dining room—receive solar radiation from the south during the winter weather. The effect of this solar radiation was not considered when the heating system was devised. It was thought of only as an auxiliary heating system for the three rooms above mentioned. On a frigid winter day when the sun is shining and when sufficient heat is generated for the important rooms by the sun alone, it was calculated that the thermostat would cut off the heat generating equipment during the hours the sun was up. That the assumptions were all correct are evidenced by the fact that the owner, in writing a letter to me as architect, said, 'Radiant heating has been very satisfactory and solar radiation has been a blessing on sub-zero days. Visitors never cease to be amazed at the warmth and unusual comfort of the house as it is being solar



heated and cannot believe that the heating unit is not on and that it has not been on for hours.' The owners of this house have lived through two Chicago winters and are obviously well satisfied with the type of heat and with solar radiation working in combination.

"The floors throughout in this house are of cement as is indicated by the detail. In this particular case the cement was left in its natural color of gray, troweled very smooth, waterproofed and waxed. Rugs cover a large part of the floor, and have no apparent effect on the efficiency of the heating system. The



Two diagrams showing how parallel tiles are embedded in the concrete floor slab. Plan on page 152 shows location of tile.

entire floor might be carpeted and I doubt if the efficiency of the heating system will be impaired very greatly. The kitchen can have asphalt tile or linoleum applied direct to the cement or the cement may be left as the owner desires.

Floor Cools in Summer

"There is another important summer effect of this masonry floor directly on the cool ground and that is the apparent effect of radiant cooling in the house on warm summer days. In the summertime, of course, the heating system is not functioning and the floor is cool, which gives an apparent feeling of coolness in the house. In addition, such a masonry floor is an excellent solution to the problem of the connection of the house to the ground."

The construction of the "panel" is shown in two details and the plan. On a bed of about 8 inches of gravel, $8\frac{1}{2}$ by $4\frac{1}{2}$ -inch vitrified clay flue tile were laid with ends butted and protected by a wrapping of paper to keep concrete and gravel out. On top of the gravel is a $4\frac{1}{2}$ -inch thickness of reinforced concrete with 2 inches of concrete over the tile. Tile lines run parallel but are spaced about 8 inches apart.

Furnace and Piping

The furnace is an oil-fired, winter air conditioner (Dowagiac) rated 100,000 to 145,000 Btu. output at the register. The resistance of the tile supply and return system proved somewhat higher than for customary metal ducts, but this was remedied by speeding up the blower. Larger capacity blowers capable of operating against higher resistances probably are a "must" in systems of this type.

The supply runs off the bonnet are interesting, as the photographs of the furnace show. The metal ducts are inserted into the supply header, which is a continuous concrete trench so that both metal mains feed into the header to set up a pressure in the system. The four diagonal return tiles end under the furnace in clay tile, turned-up elbows which project above the floor. Metal elbows connect to the cross return, which has to be "L" shaped to carry air to the blower end of the casing.

Air Temp. Must Be Adjusted

Mr. Keck is not certain where the limit control should be to stop the oil burner or, in other words, what the supply air temperature should be, but if Dr. Giescke's calculations in this issue are taken as a guide, it is probable air temperature should be somewhere between 130 and 150 degrees. More temperature is necessary than for a sheet metal plant—this is to raise the temperature of the concrete slab. Mr. Keck does believe continuous fan operation with variable supply air temperature may be a forward step to more uniform slab temperature.



This view shows how "foot" of return "T" connects with the blower-filter section of the casing. As text states—total resistance of one of these systems is quite high.

Proposed Simplified Practice Recommendation For Pipes, Ducts and Fittings*

THE initial effort to develop a simplified schedule of pipes, ducts, and fittings was made by the War Production Board early in 1942. A tentative schedule was given careful consideration at a conference called by the Plumbing and Heating Branch on January 30, 1942. The list considered by that conference proposed to reduce the number of types and sizes of fittings for gravity systems by about 76 per cent, and the number of items for forced air and air conditioning systems by about 80 per cent. Each item in the list was considered in order, and the list was further cut to eliminate items which could not be justified in the light of the existing demand for materials for war purposes.

In February the Division of Simplified Practice of the National Bureau of Standards was requested by the War Production Board to develop a simplified practice recommendation to serve as the basis for a limitation order. With the assistance of a simplification committee of the industry, the Division prepared a proposal, based principally on the action of the meeting of January 30. This was submitted to the industry for review on March 5, 1942.

A report on this canvass of opinion was submitted to the Board on March 24. By the middle of May the Plumbing and Heating Branch had prepared a new draft embodying such of the industry's suggestions as it felt were consistent with the purposes in view.

*Draft submitted by the Division of Simplified Practice, National Bureau of Standards, September, 1944.

The Division submitted this draft to all manufacturers on May 16. This brought the Division's original efforts to a close, as it then rested with the Board to take whatever action it saw fit.

The simplified practices were never made mandatory by the War Production Board. In January, 1944, the Division was advised that the Board then considered it unnecessary to its purposes to place pipes, ducts, and fittings under the restrictions of a mandatory order, but that it would in no way conflict with their plans should the Division cooperate with the industry in setting up a voluntarily established simplified practice recommendation.

In May, 1944, the same simplification committee which cooperated with the War Production Board had developed a schedule which it believed adequate as a guide to good practice for the present and the post-war days to come. They requested the Division of Simplified Practice to submit the schedule set forth herein, which already enjoys a substantial degree of approval among the producers, to all interests as a proposed Simplified Practice Recommendation.

It must be borne in mind that the current proposal, to which this outline is an appendix, is of an entirely different kind from that contemplated by the War Production Board, despite their apparent resemblance. To begin with, the purpose behind this proposal is to develop a stock list, as ideally suited to present conditions as it is possible to make it, to be promulgated as the Simplified Practice Recommendation of the in-

(Text Continued on Page 208)

Table I

x = Recommended stock items.
(x) = Items suggested in the new "Code and Manual for the Design and Installation of Warm Air Winter Air Conditioning Systems."

Item	Fig. No.	Size in inches (diameter)													
		3	4	5	6	7	8	9	10	12	14	16	18	20	24
Pipe, galvanized iron, knocked down, nested, in joints of 12-, 24-, and 30-inch lengths:															
24 gage	1	x	x	x	x	x	(x)	(x)	(x)	(x)	(x)	x	x	x	x
26 gage	1	x	x	x	x	x	(x)	(x)	(x)	(x)	(x)	x	x	x	x
Pipe, galvanized iron, knocked down, nested, in joints of 12-, and 24-inch lengths:															
25 or 30 gage, not both	1	x	x	x	x	x	(x)	(x)	(x)	(x)	(x)				
Pipe, tin, knocked down, nested, in joints of 24-inch lengths...	1						(x)	(x)	(x)	(x)	(x)				
90° elbows, galvanized iron, adjustable, 4-piece:															
24 gage	2			x	x	x	(x)	(x)	(x)	(x)	(x)				
26 gage	2	x	x	x	x	x	(x)	(x)	(x)	(x)	(x)	x	x	x	x
28 or 30 gage, not both	2	x	x	x	x	x	(x)	(x)	(x)	(x)	(x)				
90° elbows, tin, adjustable, 4-piece	2						(x)	(x)	(x)	(x)	(x)				
45° angles, galvanized iron, adjustable:															
24 gage	3			x	x	x	(x)	(x)	(x)	(x)	(x)				
26 gage	3			x	x	x	(x)	(x)	(x)	(x)	(x)	x	x	x	x
28 or 30 gage, not both	3			x	x	x	(x)	(x)	(x)	(x)	(x)				
45° angles, tin, adjustable	3						(x)	(x)	(x)	(x)	(x)				
Side collars for warm air pipe	4						(x)	(x)	(x)	(x)	(x)				
Warm air dampers	5						(x)	(x)	(x)	(x)	(x)				
Top collars	6						(x)	(x)	(x)	(x)	(x)	x	x	x	x
Stub collars	7						(x)	(x)	(x)	(x)	(x)	x	x	x	x
Drawbands	8						(x)	(x)	(x)	(x)	(x)	x	x	x	x
Tee-joint caps	9			x	x	x	x	x	x	x	x				
Flue thimbles	10			x	x	x	x	x	x	x	x				
Cold air boots or stubs:															
Style A	11										(x)	(x)	(x)	(x)	(x)
Style B	12										(x)	(x)	(x)	(x)	(x)
Transition pans	14										(x)	(x)	(x)	(x)	(x)
Ceiling plates	15										x	x	x	x	x
Side rails, double seam.....widths	16						x		x						

Figure numbers given throughout this recommendation refer to sketches shown in Plates I to VI. The sketches are intended as aid to identification of the items listed, and are not to be construed as controlling construction details.

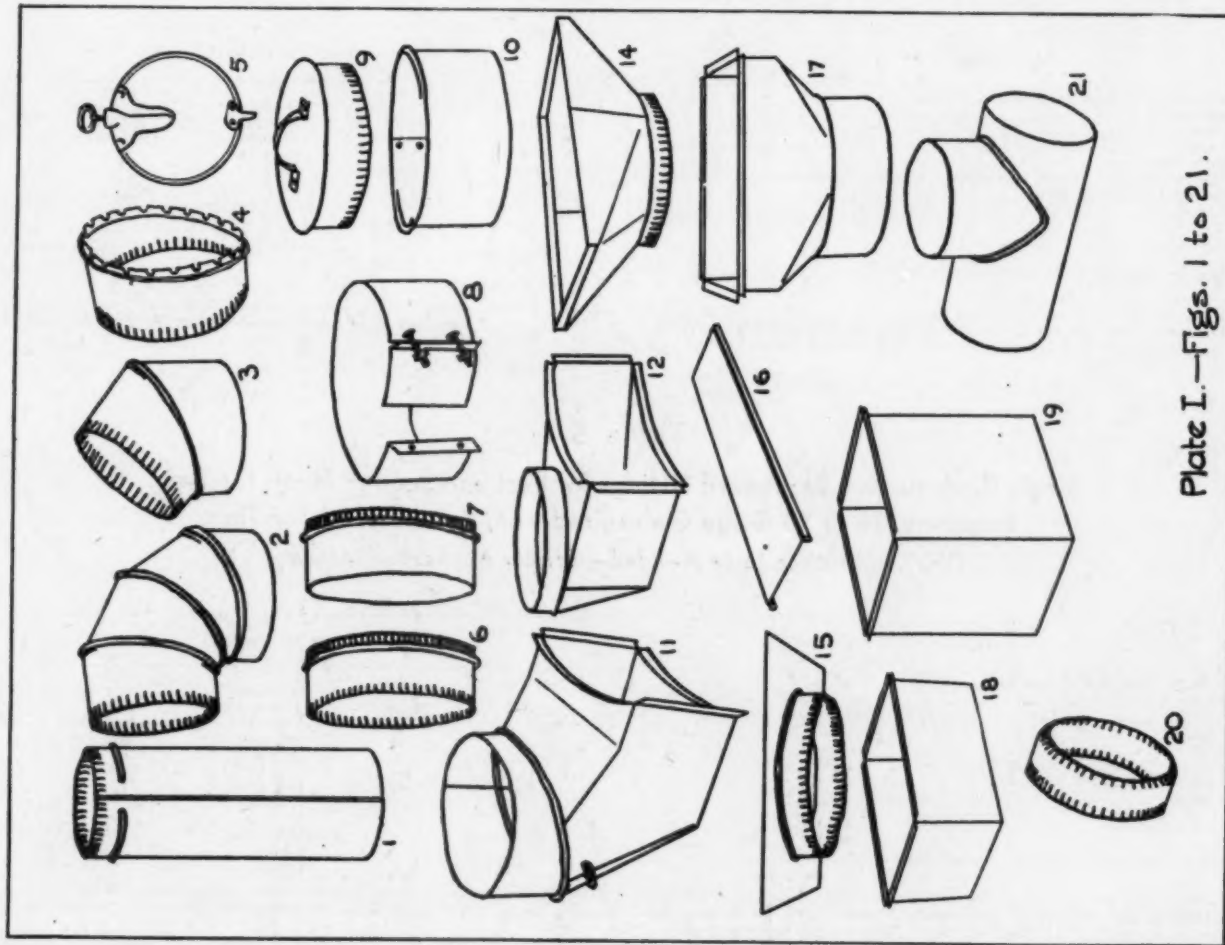


Plate I.—Figs. 1 to 21.

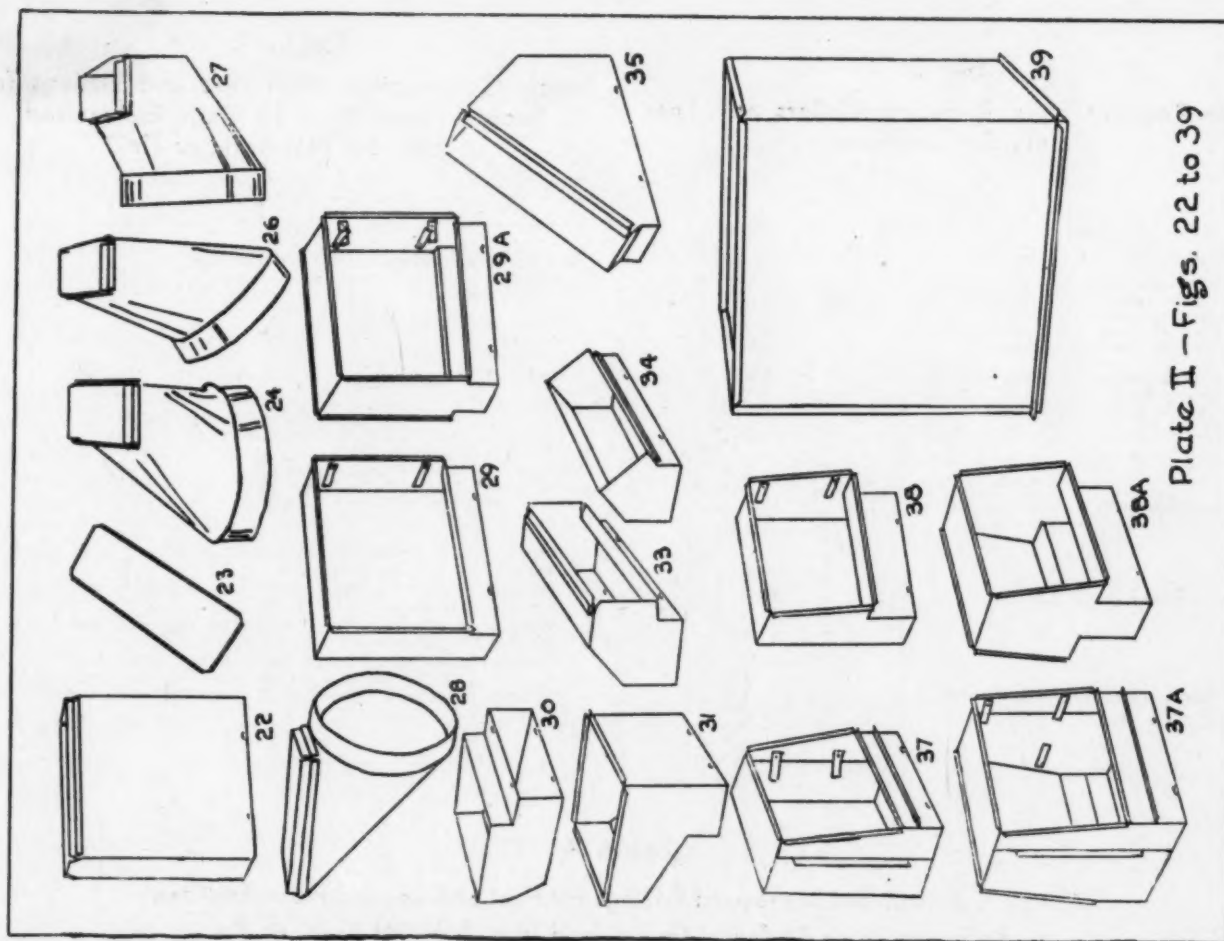


Plate II — Figs. 22 to 39

Table 2
Floor Register Pans, Reducing Collars and Tee Joints, for Basement

Item	Fig. No.	Sizes
Floor register pans, funnel style, single, with collar (last dimension is diameter of collar)..... (Fig. 17 type recommended by Gravity Application Manual)	17	Inches 8 x 10 x 8 9 x 12 x 9 10 x 12 x 10 12 x 14 x 12 14 x 16 x 14
Floor register pans, single, with or without collar: 6 inches deep	18	8 x 10 9 x 12 10 x 12 12 x 14 14 x 16
12 inches deep	19	8 x 10 9 x 12 10 x 12 12 x 14 14 x 16
Boot reducing collar	20	9 to 8 10 to 9 12 to 10 14 to 12
Tee joints, galvanized iron, 24 and 26 gage	21	Length Size 15 6 x 6 x 6 15 7 x 7 x 7 15 8 x 8 x 8 15 9 x 9 x 9 15 10 x 10 x 10 15 12 x 12 x 12

Table 3
Single Construction Wall Pipe and Fittings for Second Floor, 28 or 30 Gage Galvanized Iron, But Not Both, or Tin

Item	Fig. No.	Sizes
Wall pipes, in lengths of 6 to 96 inches, inclusive	22	Inches * x 10 and * x 12
Wall pipe caps	23	
Boots: ¹		
Universal	24	
45° angle	26	
90° angle	27	Inches * x 10 and * x 12
Center-end	28	
Stackheads:		
Horizontal for 1 register above baseboard:	29	
Horizontal for 2 registers above baseboard:	29-A	
For floor registers ²	30 & 31	
Elbows, 90° shortway.....	33	
Angles, 45° shortway.....	34	
Angles, 45° longway.....	35	

¹Boots size * x 10 have 8 in. collars, size * x 12 have 9 in. collars.

²Stackheads size * x 10 are for 8 x 10 registers, size * x 12 are for 8 x 12 registers.

³Stackheads size * x 10 are for 8 x 10 registers, size * x 12 are for 9 x 12 registers.

*Denotes depth of stack and stack fittings. The depth may be 3 in., 3¼ in. or 3½ in., but it is recommended that no producer or distributor stock pipe and fittings in more than one of these depths.

Table 4
Single Construction Baseboard Fittings for First and Second Floor, for One Register, 28 or 30 Gage Galvanized Iron, But Not Both, or Tin

Item	Fig. No.	Sizes (in inches)				
Boots to fit first floor baseboard boxes:						
Universal	24	Register size	Base extension	Outside size of throat	Free area of throat (sq. in.)	Boot collar size
45° angle	26					
90° angle	27					
Center-end	28					
Baseboard register boxes and angles for first floor:						
Baseboard register box	37	8 x 10	2 1/4	6 1/2 x 10	61	8
45° angle	34	8 x 12	2 1/4	6 1/2 x 12	73	9
		9 x 12	3 1/4	7 1/2 x 12	85	10
		11 x 13	5 1/4	9 1/2 x 13	119	12
Baseboard register boxes for second floor.....	38	Stack size	Register size	Base extension		
		* x 10	8 x 10	2 1/4		
		* x 12	8 x 12	2 1/4		

*Denotes depth of stack and stack fittings. The depth may be 3 in., 3¼ in. or 3½ in., but it is recommended that no producer or distributor stock pipe and fittings in more than one of these depths.

Table 5
Single Construction Baseboard Fittings for First and Second Floor, for Two Registers, 28 or 30 Gage Galvanized Iron, But Not Both, or Tin
(This Construction to Be Avoided—Gravity Application Manual)

Item	Fig. No.	Sizes (in inches)				
Boots to fit first floor baseboard boxes:						
Universal	24	Register size	Base extension	Outside size of throat	Free area of throat (sq. in.)	Boot collar size
45° angle	26					
90° angle	27					
Center-end	28					
Baseboard register boxes and angles for first floor:		8 x 10	2 1/4	8 3/4 x 10	86	9
Baseboard register box	37A	8 x 12	2 3/4	8 3/4 x 12	104	10
45° angle	34	9 x 12	3 1/4	10 3/4 x 12	128	12
		11 x 13	5 1/4	14 1/2 x 13	190	14
Baseboard register box for second floor.....	38A	Stack size		Register size		Base extension
		* x 10		8 x 10		2 1/4
		* x 12		8 x 12		2 1/4

*Denotes depth of stack and stack fittings. The depth may be 3 in., 3¼ in. or 3½ in., but it is recommended that no producer or distributor stock pipe and fittings in more than one of these depths.

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Product and Production Engineering

As Applied to Sheet Metal Fabrication

(Charts furnished by Troubleshooters Cooperative Corp., Detroit)

By Ernest E. Zideck
Sheet Metal Consulting Engineer

WHEN this war is over there will not be many sheet metal products which will be the exclusive property of a certain manufacturer to do with as he pleases; rather, the great majority of items will be competitive products, with many manufacturers engaged in the production and sale of identical items, differing only by slight variations in shape, appearance, and particulars of construction, and possibly in the sales price, from all other such products appearing on the market.

Undoubtedly there will be a large market for any sheet metal product which the trade and the general public want and can afford to buy, but there also will be great competition between products fabricated of identical materials and also competition between products for identical purposes made of other materials. Great strides will be made in the utilization of plastics and newly discovered hardened woods and certain die-cast metallic alloys. This, however, should not discourage the sheet metal fabricator because plastics already have been found defective in many ways and the newer materials will, no doubt, prove defective in other ways, while fabricated sheet metal goods have a reputation of long standing and will be preferred in the end.

Irrespective of the above, the trend of the times will call for certain innovations in sheet metal products. New designs and new construction methods will be called for in the products of the future. It is debatable if many of the pre-war products will continue to sell in their pre-war make-up and general appearance. Their utilitarian purpose will continue but other features will undergo more or less radical changes.

These changes will call for profound planning of the product. Its appeal to the public and its general salability will depend, in addition to its cost, on how well it satisfies the public taste that has been nourished by certain not easily detectable influences. It cannot be denied that the "foreign" influence of the millions of men (and women, too) returning to this country from all parts of the world will be strongly felt.

Planning a product which does not take this changed public taste into consideration can only result in a terrific waste of energy, time and money.

This does not mean that product planning should not be done now. It should, but it should be done on the basis of a composite picture of what we see, plus reflections of the public mind.

This may sound strange to men used to think and produce in terms of sheet steel and the tools and machines with which we customarily work. We and the public have accepted as normal progress the "streamlined" automobiles and structures exposed to the public eye; the streamlining of refrigerators, cabinets, fixtures, utensils and many sheet metal products.

The reasons for these changes are sales acceptance and eye appeal.

So, whenever we start planning of products for the post-war market or production in post-war industry or product and production engineering, we must make public acceptance our major aim no matter how much this may change the products we used to make or plan to produce. There are hundreds of sheet metal items we manufactured and sold successfully before Pearl Harbor—we can go ahead and produce and sell these same items. But within two years after the reopening of the market these goods will be obsolete; newer products will come into prominence and will sell, while our own obsoleted products will not sell.

So the question is: Ought we go ahead with preparations for the manufacture of the products we made before the flow of materials was curtailed, or ought we minimize such production to the immediate market while devoting the larger part of our energies and means to the planning of new or improved products which meet fully the new public taste?

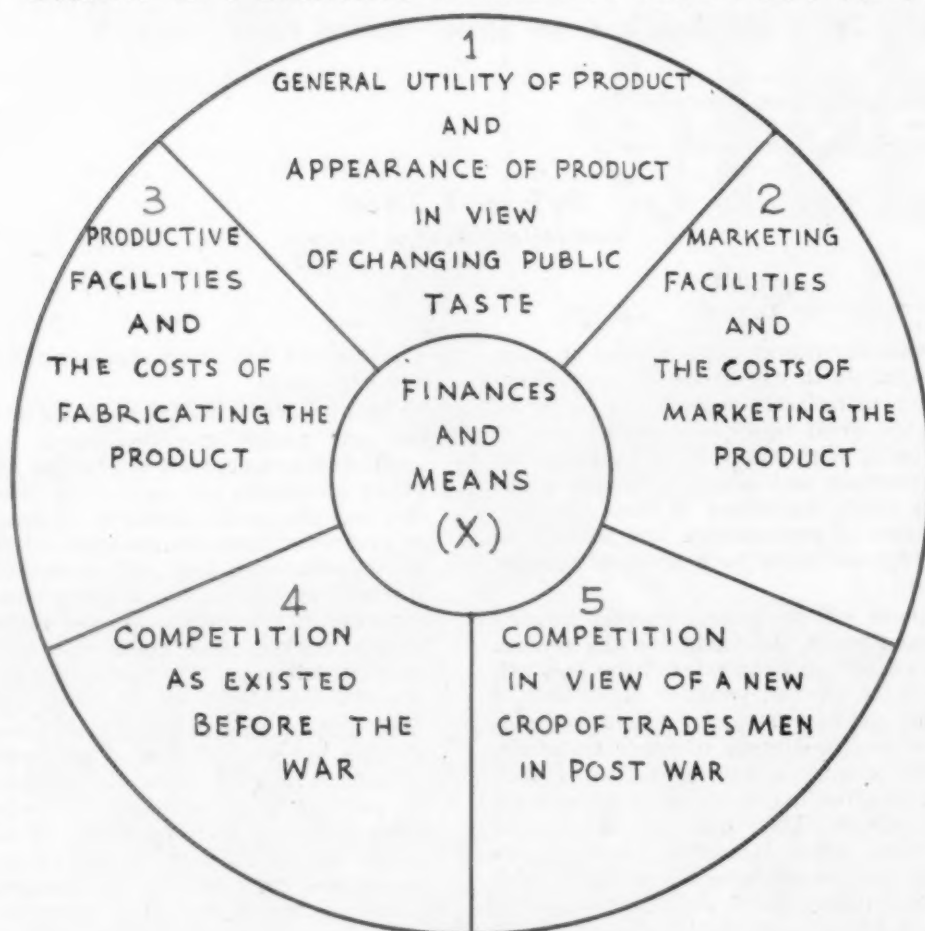
The answer is obvious. No shop should be modernized or built and equipped just to produce items that were in vogue before the war. That shop or factory should make provisions for changing the character of the products so that the items will find public acceptance.

Machines and Tools

In metals, future production will be confined to die-casting, presswork, and fabricating. In the latter activity—with which we are concerned here—more solid and better fitting products will be wanted. The age of flimsily constructed wares is considered past. People will demand goods of pleasing appearance, durably constructed, at a not too high price. For this fabrication we will have well constructed and durable machines and tools with a large number of new designs. Welding and brazing will effectively take the place of older binding means—the designers and builders of all kinds of practical jigs will do a good business. Much fabricating will be done by new designs of drawing and extrusion rolls.

On the other hand, it seems possible that there will be only limited use for such machinery as the hydro-press, the drop hammer, the automatic hammer, the rotary shear, the Farnham rolls, the router and other machines and tools which came into use largely because of aircraft work. This equipment can be used to advantage in experimental work, but in "mass" production even aircraft will be changed to more effective modes of construction than were employed during this war. The above machines and tools have been doing good service while aircraft are built piece-meal, by hand largely. Sheet aluminum, as long as it requires hardening-after-formation, will not figure much

CHART I. PLANNING PRODUCT FOR POST WAR



(X) FINANCES AND MEANS: Planning starts with money available or quickly obtainable; and with existing or procurable shop facilities and machines and tools and competent personnel.

(1) GENERAL UTILITY OF PRODUCT: This phase of planning is obvious; the product must render service; its worthiness will be gauged by the thoroughness in which it performs; but the public will prefer the product having the above qualities plus added eye appeal.

(2) MARKETING FACILITIES: In the immediate post-war future the public will want utilitarian goods and novelties and luxuries. The market will continue wide open so long as the public has surplus money to spend. Advertising will continue the best medium of marketing. Transportation facilities will be enormous (and cheap). The "costs" of marketing should be less than they were in 1941.

(3) PRODUCTIVE FACILITIES: Decentralization of manufacturing is in the offing; the South, the Southwest, the Pacific slope, the Northwest—all will build new shops and factories. Builders of machines and tools will be busy, but there will be about one-third of the machines and the tools now idle in the war plants available for the new shops. Labor will be plentiful, especially in the smaller

communities, because the war worker and the service man will want to live a "peaceful" life. Costs of production, with the "right" personnel to inaugurate and systematize production, will be about 50% higher than they were in 1941.

(4) COMPETITION will be slow in crystalizing. Shops which plan the product and plan its production now, and do it "right," will be without much competition in the two years following the conclusion of war in Europe. But in the period that will follow, competition will be intense; obviously the shops that steal "a jump" now will have that much advantage over the late comers.

(5) NEW COMPETITION: The great army of war workers and army and navy men taught the trade, likely will continue at it by at least 35%. Twenty-five percent might be counted to seek employment in existing shops and factories. A good ten per cent, desiring to settle down in their home towns, will go into business of their own. Some of the new businesses may remain in the field of house and home appliances; others will go into manufacturing. The burden of this new competition will be felt mostly by the antiquated shop and the little factory that did not outgrow its past or that has been built and equipped and is run on past performance alone.

in the post-war production. Aluminum alloys will be used for casting and for press work, but these alloys will not compete with steel, especially the rust-proof steel, under constant development now. The hydro-press will do good forming work in soft metals, but it is not so good in forming steel, no matter how thin. That same criticism applies to the router and other machines and tools devised for working soft aluminum. Formative work in sheet metal that cannot be done in the press brake will be done, as it has in the past, by dies.

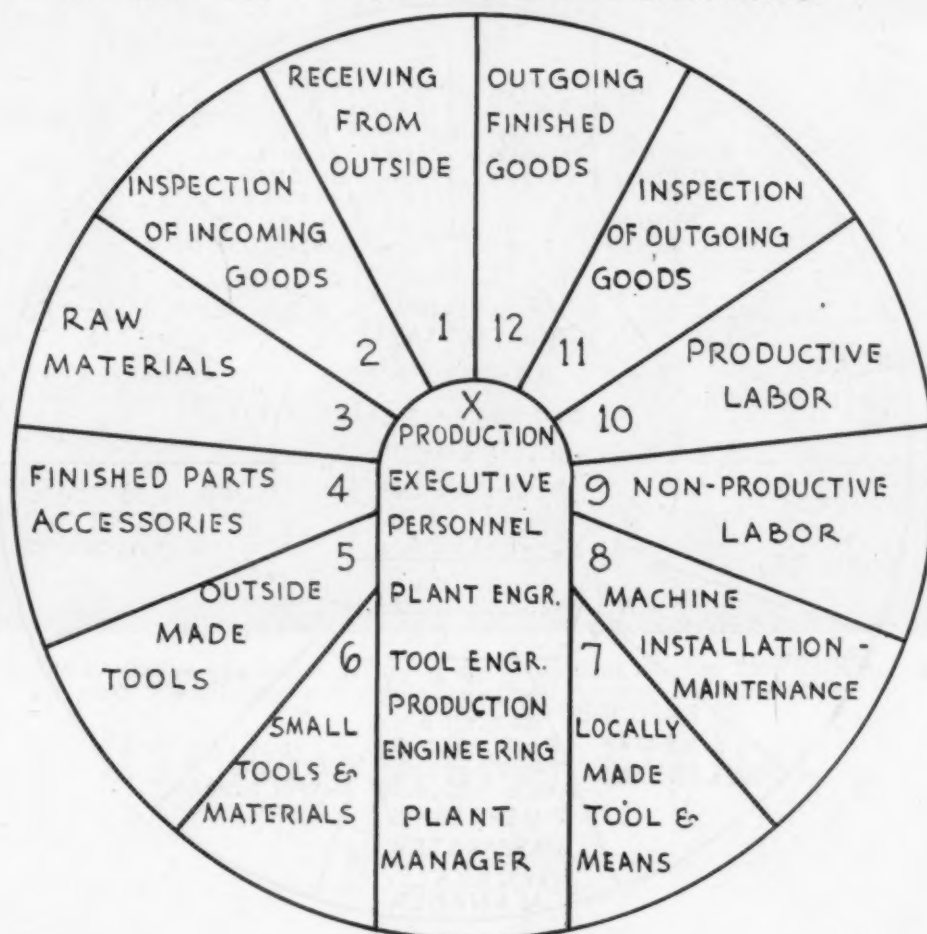
The press brake will come into a more diversified use when built to do press work as a press does. But

it seems safe to say that no machine will have much of a future that does the work half-way, requiring additional hand work or too much manual labor to get out a half-formed, inaccurately formed part. Such machine performance was satisfactory in the initial building of aircraft, but it will not be satisfactory for the competitive production that lies ahead. In planning for the future, then, we must also plan the MEANS by which to mass produce.

The Problem of Labor

Thousands upon thousands of workers, both male and female, have been trained at government expense

CHART II. PRODUCTION PLANNING



(X) The plant manager (or shop owner), who receives from Product Planning (Chart I) complete data as to what the product shall be, employs, to start with, competent production engineers, who dissect the product to its component parts and outline the processes and the means by which such production can be accomplished best in view of the facilities of the plant itself and of the means available or procurable. The next step is to arrange the plant and the means for systematized production, making provisions for each of the items, in a systematic order, as shown in the above chart.

(1) RECEIVING: Of materials, accessories, tools, parts and finished or semi-finished goods from the outside is given its proper place.

(2) INSPECTION: Of the incoming materials and tools must be arranged for methodically.

(3) RAW MATERIALS: Are stored for immediate use and necessary controls must be established for the issuance of materials to the respective supervisors of production.

(4) FINISHED PARTS AND ACCESSORIES: Issuance must be governed like Raw Materials by the Parts Sheets emanating from Production Engineering.

(5) OUTSIDE MADE TOOLS: Should be rigidly inspected before accepted for use.

(6) SMALL TOOLS AND MATERIALS: Are given into the custody of a man responsible for them and are issued by him against Engineering Orders or on request by the Production Supervisors, which orders in writing are kept on file.

(7) LOCALLY MADE TOOLS: Are made under the supervision

of the Tool Engineers who design as per Tool Analyses Sheets emanating from the Production Engineers.

(8) MACHINE INSTALLATIONS: Are made to plans emanating from the Plant Engineer. The machines are "maintained" by a Maintenance Department which keeps the whole plant in good working order.

(9) NON-PRODUCTIVE LABOR: Production Engineering establishes data as to labor necessary to handle the materials to and from storage to the men at the machines, move materials and parts, and generally aid the stores, the production forces, the maintenance, and receiving-shipping.

(10) PRODUCTIVE LABOR: Production Engineering must also establish data showing how many men are required at a certain machine to do a certain operation, and how many more men are necessary to keep the parts moving through the various stages of operations to the final assembly and finish of the product.

(11) INSPECTION OF OUTGOING GOODS: Embraces also inspection which is done on individual operations, individual parts that go into the assembly, and all other inspection necessary to guarantee the fit of the parts in sub-assemblies and the final assembly.

(12) OUTGOING FINISHED GOODS: Embraces necessary packing and crating, loading, delivery to transport.

(X) The Production Executive Personnel embraces supervisors over Receiving, Inspection, Stores and materials issuance; also over Production from first to last step, Inspection in Production and of the finished Product, and over the Outgoing of the completed goods.

to do sheet metal work. These workers have been recruited from farms and cities in every state of the union. They have been working in sheet metal, using sheet metal machines and tools, in aircraft factories scattered all over the country. Additional thousands have been trained by the Army and the Navy to do

sheet metal repair work at the aircraft bases, repairing and reconditioning planes that were damaged or put out of order. All these thousands, their numbers reaching well into hundreds of thousands, will come out of this war knowing no other work but what they call "sheet metal work." About 30 per cent of these



Group of wet-type, ventilated flexible shaft burring and rotary filing benches. Each bench provides two working stations and incorporates an integral wet-type dust collector.

Magnesium Dust Control

By John M. Kane
Engineer, American Air Filter Co.

TODAY there are hundreds of dust collecting systems handling dust incidental to the finishing of magnesium parts. The safety experience in collecting magnesium dust compares favorably with the fire and explosion experience of other materials such as grain, coal, spice, cork and similar products whose explosive or inflammable characteristics have been extensively studied for a longer period. This record is the result of complete cooperation between the dust collector manufacturer in developing equipment; the sheet metal contractor in the installation of exhaust systems; the supervising and maintenance personnel who keep dust control systems in proper working order; and the insurance, technical and research groups who have investigated and distributed data on the requirements for safe practice in the control of this interesting metal.

Magnesium has a specific gravity of 1.74 and a melting point of 1204° F. As normally encountered in industry, magnesium is in the form of an alloy having from 88 to 98 per cent magnesium, with the balance consisting of one or more materials such as aluminum, zinc, manganese, and silicon. In the dust form a cubic foot will weigh from 25 to 35 pounds, depending on particle sizes and method of packing. It is in the dust or finely divided state that it becomes a fire and possible explosion hazard due to its ease of ignition, intense and rapid propagation of combustion, and the release of pressures that may reach explosive proportions. In the dust state with particles smaller than 200 mesh, ignition temperatures of 900° F. and pressures of 70 pounds per square inch have been recorded.

Magnesium Dust Collectors

Numerous dust collector designs are now available and have been extensively used for magnesium dust control. In each case they fulfill the following essential requirements to reduce the fire and explosion hazard where fine magnesium dust is generated.

1. They prevent accumulations or storage of dust in the dry state.

2. They are available in unit types to eliminate long runs of piping, and to isolate the operations so possible fires will cause a minimum amount of damage.

3. They remove entrained dust from the air stream immediately on entering the collector and before it passes through rotating parts of exhauster.

Most collectors now in service use water as the collecting medium. While damp magnesium dust does burn with greater violence than dry material, the condition in a dust collector is carried to the opposite extreme and the collected dust is stored in a "flooded" state under water. Where the percentage of water exceeds approximately 50 per cent, magnesium dust cannot be ignited, accounting for the excellent experience of wet dust collectors for this service.

Magnesium dust does react with water forming magnesium hydroxide and releases hydrogen. The rate of hydrogen evolution, however, is so slow that it can be vented from the dust collector in a safe, very diluted state even though collector is not in operation.

In place of water, oil has been used to a limited extent as the collecting medium. While oil has the

apparent advantages of retarding the ignition of magnesium dust and preventing the generation of hydrogen, these advantages have proved more theoretical than actual in the light of existing practice where most dust collecting installations use water for the precipitation of magnesium dust. The consistent quality, available supply and inexpensiveness of water is in its favor and the probable secondary problem of oil vapors in the collector discharge is eliminated.

The specific requirements for dust control systems will vary with the fineness of dust particles generated, the quantity of dust produced, and the possibilities of ignition while performing a given operation. A discussion of the more usual operations will indicate the factors involved with a wide range of dust conditions.

Stand or Pedestal Grinding, Polishing, Buffing

The stand or pedestal grinding, polishing and buffing groups of operations are the potential source of most severe fires. Sparks may be produced by hitting an imbedded core wire or bit of silica against the grinding wheel. Dust loads are heavy and the dust is fine. Poor hood design or duct construction will permit lodging of dry accumulations which could ignite in the presence of a spark and burn violently. A lubricant is used to prevent wheel clogging and excessive amounts can be thrown from the wheel, causing sticky areas on hood or duct walls to which dust will adhere.

For these operations, dust loads vary widely, but a typical dust collector on a two-wheel grinding or polishing stand will normally collect from 5 to 30 pounds of magnesium dust in an 8-hour period. A typical screen analysis indicates the following particle size distribution:

	% by weight
Retained on 60 mesh.....	12
Passing 60, retained on 100 mesh.....	26
Passing 100, retained on 150 mesh.....	33
Passing 150, retained on 200 mesh.....	19
Passing 200, retained on 325 mesh.....	7
Passing 325 mesh	2

Of the particles passing 325 mesh, 24 per cent by particle count were less than 5 microns in largest dimension.

To safely control dust from grinding, polishing and buffing wheels, a unit type of wet dust collector should be used and no more than two wheels should be ex-

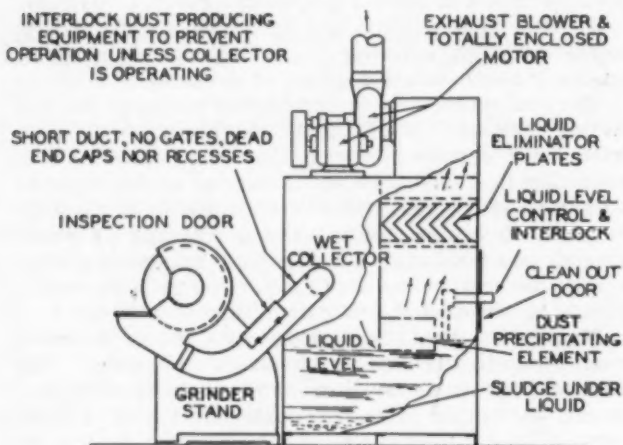
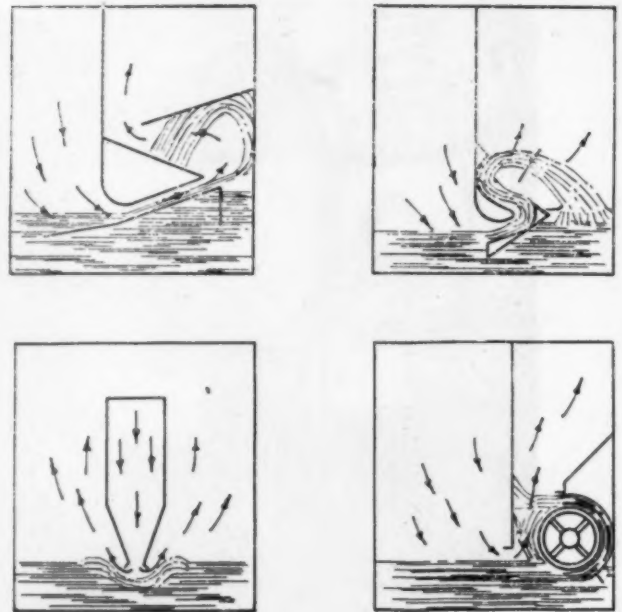


Fig. 1.

Elements of a safe unit-type dust collector for magnesium as recommended by the NFPA.



TYPICAL DUST PRECIPITATING ELEMENTS

Fig. 2.

Typical dust precipitating elements of collectors and benches that remove the entrained magnesium dust from the exhausted air—source NFPA Code.

hausted by a single collector. Where possible, dust collector air entering zones from each grinding wheel should be compartmented to prevent possible flareback through both branches in case of fire, and access doors should be so designed that they act as pressure relief openings. Dust collector should be located as close to the grinding stand as possible to keep branch ducts to a minimum length.

Conventional exhaust hood designs are used for operations in this group except that traps must not be incorporated in the bottom of the hood design. Exhaust connection should be made at the back of the hood close to the bottom. Transition from hood to round duct should be eccentric so lower element forms a continuation of hood bottom and does not provide a pocket for dust accumulations.

Branch ducts from each hood should run directly to dust collector without joining. Blast gates, traps, screens, or other obstructions or abrupt changes must be avoided. Extreme care in duct fabrication is necessary to assure smooth interior surfaces. This precaution is especially true of elbows, which should be of long radius design with inside radius of not less than 1.5 diameter of branch, preferably of two duct diameter inside radius construction.

Minimum branch sizes and exhaust volumes are shown in Table A, which conforms to standard practice for grinding, polishing, and buffing of other

TABLE A
Exhaust Requirements for Magnesium Grinding, Polishing and Buffing Wheels

Wheel Diameter	Grinding		Polishing, Buffing	
	Max. Wheel Thickness	Min. Pipe Dia.*	Max. Wheel Thickness	Min. Pipe Dia.*
Over 9" thru 9"	1 1/2"	3"	2"	3 1/2"
Over 9" thru 16"	2"	4"	3"	4 1/2"
Over 16" thru 19"	3"	4 1/2"	4"	5"
Over 19" thru 24"	4"	5"	5"	5 1/2"
Over 24" thru 30"	5"	6"	6"	6 1/2"
				Min. CFM
				300
				500
				610
				740
				1040

*Where hood design must be relatively open, use branch size and exhaust volume listed for wheels in next size group.

metals. Volumes are based on conveying velocities of 4,500 f.p.m. However, due to the light weight of magnesium parts, larger castings can be handled than is usual with other metals. This frequently requires a more open exhaust hood construction, necessitating the exhaust of larger air volumes. In such cases, the branch size and exhaust volume recommended for the next larger groups of wheels is usually used.

Wheel Truing

The committee on Dust Explosion Hazards of the NFPA has called attention to unfavorable fire experience during the truing operations of magnesium grinding wheels. Sparks are generated during this operation at a time when some embedded magnesium and wheel lubricant is thrown from the rotating grinding wheel.

Special precautions must be taken to be certain that hood surfaces, ducts, and collector intakes are free from accumulations before, during, and after truing operations. Where possible the assignment of a thoroughly schooled operator to all wheel truing operations is recommended.

A survey of many processors of magnesium indicates with one exception, that such wheel truing operations have caused no fires, and that the dust collector is connected during the operation. Yet, if there is any question concerning proper maintenance of equipment, it may be safer to disconnect the exhaust duct from the wheel hood and direct the sparks with a deflector toward a thoroughly cleaned floor area in the vicinity. This procedure is prompted by the thought that any fires that may be started by the sparks will not be confined in hood or duct where ignition of chance accumulations could cause pressures of explosive proportions.

Flexible Shaft Grinding, Burring, Buffing

The ease with which magnesium can be finished and the intricacies of many castings has accounted for the large amount of bench finishing work where small air or motor driven flexible shaft tools are used. Tools vary widely and include steel burrs, small emery wheels of many shapes, emery cloth discs, cylinders or strips, and various buffing heads. Magnesium dust is generated in a light concentration but the particles are very fine.

The control of operations in this group is almost exclusively obtained by the use of a grided top working bench of a design that incorporates a safe wet type dust collector in the assembly.

Exhaust air is moved downward through the bench carrying the dust directly to the collector as generated. The storage reservoir beneath the bench inundates all particles immediately, and there must be no ledges where dry particles can accumulate.

Working stations are separated by vertical partitions to isolate any fire, and the National Fire Protection Association Code recommends the incorporation of not over four working stations in any one ventilated bench assembly.

The grinding bench arrangement provides an ideal installation in that duct connections are eliminated and the entrained dust is immediately removed from the air stream and safely stored under liquid in the bench hopper. Minimum recommended exhaust volumes are 200 cfm. per square foot of gross grille area. This volume has proved ample for most applications,

although some plants have established standards of 300 cfm. per square foot of grille area. Grilled working areas are usually 30 inches deep. Each working station is generally 4 to 5 feet wide, sometimes wider, depending on the work to be finished. Stations less than 4 feet wide rarely provide sufficient room for the operator.

Flexible Shaft Rotary Filing

Operations in this category are normally done on work benches and are distinguished from the Flexible Shaft Grinding, Burring and Buffing group by the size of magnesium particle removed. Rotary files remove particles that can be classed as very coarse dust or very small chips. As such they do not represent the fire hazard that is present from the fine dust product in the operations previously described. Considerable volumes of chips are produced and during the period of extreme magnesium scarcity they could be sent to a refinery for reclamation if dry. Running from 1 to 3 per cent by weight of the castings finished, chips from rotary files represented a source of considerable magnesium. This situation resulted in the elimination of dust control from rotary filing operations in many plants because it never proved practical to salvage the chips when collected in a wet type dust collector.

As the supply of magnesium increased, the salvage of the filings became uneconomical and they are now discarded in most plants. At the same time, the trend has been toward the more extensive use of dust collectors for this operation. Collector is of the combination bench and wet type unit described for Flexible Shaft Grinding, Burring and Buffing, and the exhaust volume requirements are identical to those listed for that group.

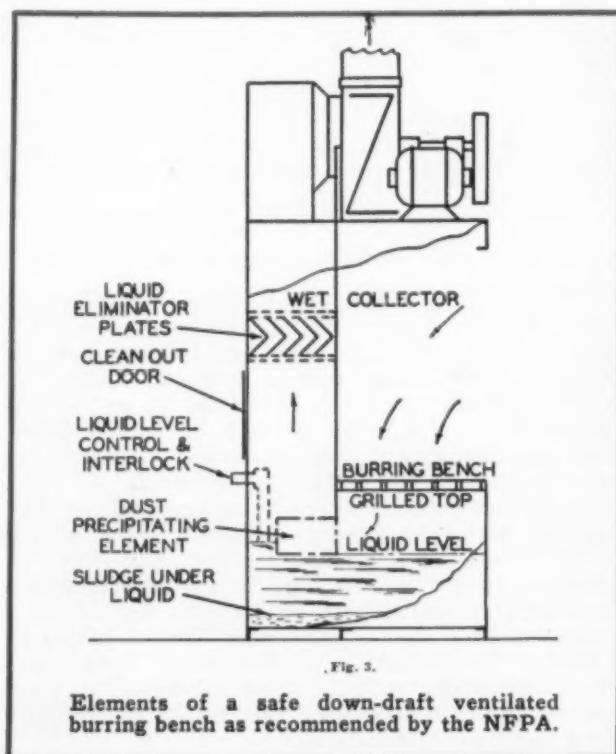
Use of dust collecting units for rotary filing operations provides cleaner working conditions and greatly improved housekeeping. It prevents that occasional fire and permits safe inter-change of all flexible shaft operations.

Band Saws

In the magnesium foundry, band saws are extensively used for removing sprues from castings. The sawdust is coarse in particle size, and like the chips from rotary filing, does not represent the fire hazard of finer dust particles. At one time the sawdust represented a source for the reclamation of magnesium and consequently dust collectors were not employed.

The volume of sawdust is appreciable from a band saw. At one plant 400 pounds of sawdust was collected from three band saws in one 24-hour day from 15,000 pounds of castings. This means constant housekeeping must be followed or sizable piles of magnesium particles will accumulate. Fires can occur quite readily from hitting a hidden core wire, or from friction between saw blade and poorly adjusted guides.

For maximum safety, dust collectors for band saws should be of the unit type as described for stand grinders. An exhaust volume of approximately 1,000 cfm. is recommended for each saw using one branch from the conventional outlet below the saw table, and a second branch from an adjustable hood above the casting. This latter branch is desirable on most operations because the higher sprues are so far from the table that considerable sawdust from that area is not carried below the work table by the traveling saw blade, but is dispersed in the working area.



In the dust collector design, storage capacity under the liquid level must be sufficient to accommodate the volume of sawdust that will be collected between cleaning periods.

Abrasive Cleaning

Fine magnesium dust is removed by abrasive cleaning during finishing operations, but the hazard does not approach that of the operations previously discussed under stand or flexible shaft grinding, polishing or buffing. Where sand is used as the abrasive, the magnesium particles represent so small a percentage of the total dust load that no special precautions are indicated. Samples from one magnesium foundry indicated less than 1 per cent magnesium in the dust from the collector exhausting a sandblast room.

Where steel grit is used, the percentage of magnesium increases due to the greater resistance of the abrasive to shattering. Certain quantities of fine grit are also collected, making a mixture that is inflammable in a dry state. This condition is especially true in finish blasting and in the cleaning of melting pots, as no inert sand fines are present to dilute the percentage of magnesium and steel dust. For these operations a wet type dust collector is recommended. Exhaust system piping should be free of dead end caps or recesses where quantities of dry dust can accumulate. Cleanouts should be located on top of ducts and they should be spaced not more than 20 feet apart. They should have an area not less than the duct cross section and should be hinged or provided with chains and designed to act as pressure reliefs in case of fire.

Exhaust volumes should follow manufacturers' recommendations or the American Foundrymen's Association Code.

Other Magnesium Dust Producing Operations

While the bulk of the operations described are common to the magnesium foundry, identical or similar operations will be encountered in the final finishing

and assembly of magnesium parts. The same method of control and exhaust requirements apply.

This is also true in the fabrication of magnesium sheets and shapes where dust and fine particles are produced from sawing, polishing and sanding operations.

Safety Precautions

On all dust collectors handling magnesium, the following precautions are recommended:

1. Totally enclosed motors should be used to prevent settlement of fine floating particles in motor windings.

2. All equipment should be grounded.

3. A protective device should be provided with the dust collector, which will prevent operation unless correct liquid flow and proper liquid volume are maintained.

4. Electrical interlock should prevent operation of dust producing equipment unless dust collector is in operation.

5. Equipment used for working magnesium must not be used for ferrous metals until thoroughly cleaned. Warning signs to this effect should be located throughout the area.

6. Clothing of operators doing grinding, buffing, burring or polishing should be smooth, fire retardant material without pockets or cuffs where dust can lodge.

7. Dust collectors on grinding, buffing, burring or polishing operations should be thoroughly cleaned daily, and hoods and ducts inspected for any possible accumulations.

8. Extreme care should be exercised in the use of cutting torches or welding for repairs. All collector parts should be cleaned thoroughly and access doors left open before such repairs are started.

9. Remove grinding, polishing, or buffing wheels during periods when they are not required for magnesium work. This will prevent accidental grinding of ferrous tools on such grinding stands.

Disposal of Collected Dust

Safe disposal of magnesium dust will vary with the quantity collected and conditions at a given plant. Early recommendations suggested mixing the collected dust with five parts of sand and burying it in a dumping area. Shortcomings of this method became



Unit-type wet collector, collects and safely stores magnesium dust from propeller cuff routing machine.

apparent in plants where large quantities of dust required disposal or where combustible material was dumped in the same area.

In most plants magnesium dust is now burned in an open outdoor area on a layer of fire brick sloped to allow drainage. Wet dust from collectors contains approximately 50 per cent water and consequently is difficult to ignite. A layer of dry refuse placed over the dust provides a safe means of ignition. In burning it supplies the necessary heat to dry the magnesium sufficiently and at the same time acts as a blanket absorbing much of the heat and light from the burning metal.

Recirculation of Air

Magnesium dust particles are relatively coarse compared to many industrial dusts, and they are removed with very high collection efficiency by most collectors suited to this service.

Air is being satisfactorily recirculated from many collectors handling magnesium dust from grinding, buffing, polishing, burring and rotary filing. Recirculation provides considerable heat savings and permits rapid relocation of collectors with change in plant layout. Certain states, however, and many industrial concerns have regulations preventing the recirculation of air from any exhaust system, and such a policy would include magnesium exhaust systems.

Even where policies exist opposing return of air from dust collectors, recirculation of air is sometimes

permitted from operations such as rotary filing, band saws, and possibly flexible shaft burring as dust collectors are installed on such systems primarily for fire protection and as an aid to good housekeeping.

The total exhaust volume from ventilated flexible shaft bench operations accounts for a very high percentage of the total exhaust requirements and recirculation where permissible has a distinct advantage even though the exhaust from stand grinders, buffers and polishers is discharged to the atmosphere.

Recirculation from abrasive cleaning operations is not recommended and is of questionable practice due to the higher dust load, finer dust particles, and the presence of sand either removed from the castings or in the form of spent abrasive.

References

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Report of Investigations—Inflammability and Explosibility of Metal Powders—RI 3722, October, 1943, U. S. Department of the Interior, Bureau of Mines.

Code of Recommended Good Practices for Metal Cleaning Sanitation—American Foundrymen's Association, Industrial Hygiene Code.

The Control of Magnesium Dust—Transactions, American Foundrymen's Association, page 228, September, 1943.

War Has Brought a Rebirth of Private Enterprise

By Louis E. Narowetz, Chicago

IN general the progressive sheet metal shop owner has profited greatly from the increased tempo of war work and the stimulation which comes from making more, with less. Greatly increased volume, and the stimulus of varied work has obliged him to use his genius.

In order to meet the stepped-up demands of delivery, he has had to learn the use of jigs and methods unheard of prior to the production line schedules of war work. The scarcity of raw materials has made the owner—and the workmen, too—acutely conscious of waste; scrap is now minimized and reused instead of going out the back door.

The migratory workman has contributed much to our war-time fund of knowledge of ways and means of doing things—his ideas and experiences have made up in considerable degree, for the time formerly spent visiting conventions and displays of new machinery and methods which the owner now cannot take away from his tough schedules.

The serious drain on manpower by the armed forces has forced the owner to seek seriously—first among his own men and then among outsiders—for ability and mentality to lead men. This has done

much to bring out latent qualities among men normally backward in shop routine.

Under this influence of leadership, many men have felt the zest of accomplishment and, after the war, it is likely that many new shops will be opened by these leaders who have been laying away a portion of their premium wage.

In spite of the restrictions and difficulties in getting new machinery, the average shop will be better tooled at the end of the war than it was in peace time and the owner will be acutely conscious of the time and labor saving made possible by improved tools and machinery and by the methods which have made up for war-time manpower shortages.

After the war, competition will be keen; owners who formerly felt secure because of their "know how" will have to watch for the "intercepted pass" which may put business in the hands of war born newcomers with equipment and aggressiveness.

All of this may be a rebirth of private enterprise at the very grass roots—a healthy sign—and possible only in a constitutional democracy such as ours here in America.

Hoods, Valves and Accessories

For Wood Working Machinery Hoods

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SANDING machines are made in numerous ways, but the three types demonstrated particularly require piping and hoods. Fig. 65, Plate No. 30, illustrates a single drum sander with hood hung underneath. In Fig. 66 a three drum sander joined to one hopper is shown.

Large drum sanders, as in Fig. 67, usually have individual hoods which can be made the shape of either of the hoods I, II or III illustrated.

Disc sanders are for surfacing boxes, blocks, etc. Fig. 68 presents a single disc sander with hood and hopper connected. Double disc sanders of the smaller sizes are hooded and piped as in Fig. 68. For large double disc sanders two suction pipes are provided as shown in Fig. 69. Some of the fine dust carried around by the disc is exhausted by the top pipe. Such hoods must be made to conform to the particular machine and to suit the convenience of the operator.

Belt sander hoods are made in various ways to trap the dust, and Fig. 70* and 71 show typical examples. The dust clings to the sanded surfaces, and as it curves around the wheel, the expansion of the outer edge of the belt permits the air currents to remove the dust. The dust carried around the wheel is trapped by the secondary hood. Frequently a piece of leather belting is bolted to a steel plate to make it adjustable so it will rub the belt, loosening some of the dust to be trapped by the secondary hood.

In factories where dust conveying is done, floor sweep connections are located at various places by attaching a 6-in. pipe to another branch pipe or by running a separate branch to the suction main. At the branch end, the hood is provided with a flap door, which can be opened to sweep dust and refuse into the air current. There are two types of such sweeps—up floor sweeps (see Fig. 72, Plate No. 31) and down floor sweeps (see Fig. 73).

These sweeps are only used at odd times when other machines are closed down and therefore no extra allowance in area is made in the suction main. They are merely tapped in where desired and no enlargement in branches or main line is provided. Up floor sweeps may be made as shown at A or as a rectangle transitional elbow, as B. Up sweeps have the advantage of compelling the air currents to lift all solids and blocks, etc., which are too heavy, are easily re-

moved. Often a slot is cut at the heel of B to give a continuous suction, also permit nails, washers, rivets, etc., to drop out before being drawn into the piping system.

Down floor sweeps are built with a high throat, as at C or D, Fig. 73, to prevent large blocks, sticks and other unsuitable material from entering. Sweeps as at B and D make the best designs, but the boxes A and C are also used.

Blast gates having a cast iron frame and heavy steel gates are most serviceable, as at E and F, Fig. 74. Cast iron ball joints G are also serviceable and are used in places where a hood must swing back and forth or in an arc. Swivel joints H are adaptable where limited flexibility is desired.

Where a pipe must be flexible to swing forward or backward, a swing joint K, Fig. 74, is made. The side hinges are usually of $1\frac{1}{4}$ to $1\frac{1}{2}$ x $3/16$ to $1/4$ -in. flat bar and bent as shown in the detail, but where a greater sweep is needed, a knuckle joint as J is used, which allows a 30-deg. sweep on each side of a vertical line. However, the hinged part must be strongly built and the joint strongly anchored. Where some side movement is produced, it is safest to use a cast iron ball joint.

It is important to brace all such pipes well with bracket or ceiling stays, to stiffen with three or four guy rods and turnbuckles and to so adjust as to provide a suitable swing as required.

Plate No. 32 shows details of various standard valves used on the discharge pipe system. Fig. 75 shows the general construction of a standard two-way valve, the shell part of which is a two-way breeching from square to round, an offset being provided on the rectangle end in which the valve plate fits without obstructing the flow of material. This shoulder offset is made in many ways, as indicated in the sketch and diagram C and D. When made as at C, an arch is provided on the side a to allow the leaf to swing, while the side is straight, as at b.

In constructing the valve plate, a fork, as at B, is made and heavy sheet steel bent around it as indicated in the dotted lines. Other designs are also made, but the valve must have ample support, as operators open or close these valves very roughly, and if no suitable core is provided, the metal leaf bends or pulls loose from the core.

(Continued on Page 210)

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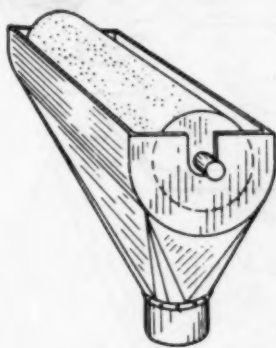


Fig. 65. Hopper for single sander.

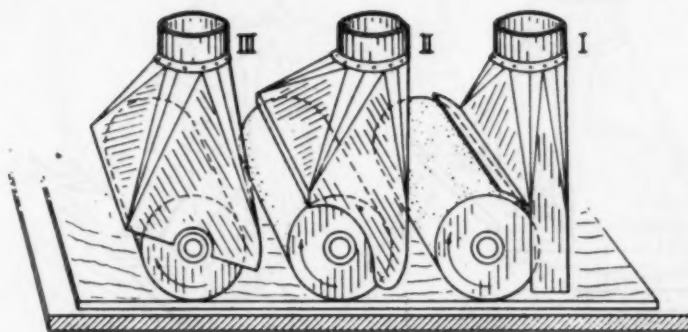


Fig. 67. Top hoods for large three drum sander with different ways of designing hoods.

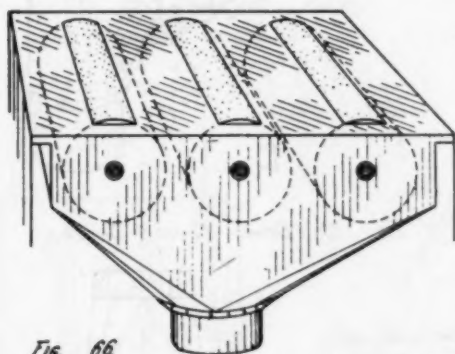


Fig. 66. Hopper for three drum sander.

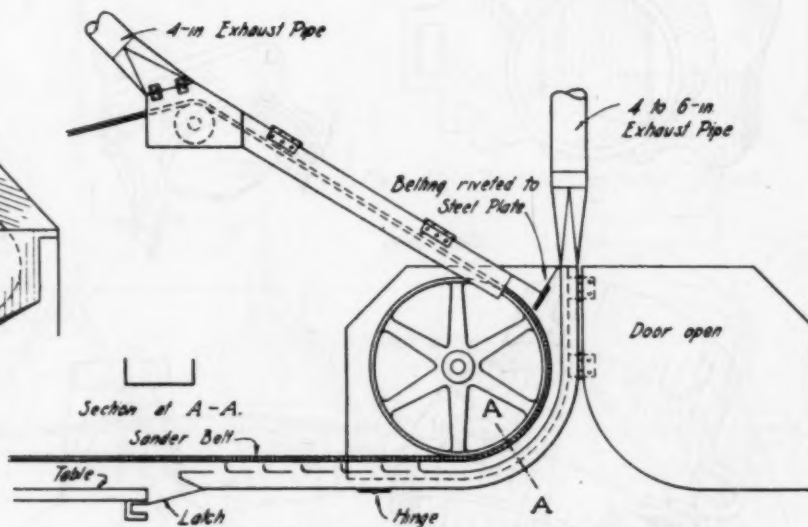


Fig. 70. Double hooded belt sander. (Used by permission)

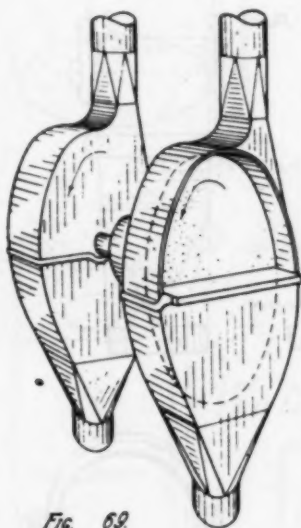


Fig. 69. Large double disc sander double piped.

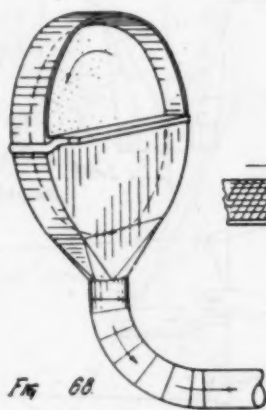


Fig. 68. Single disc sander hooded.

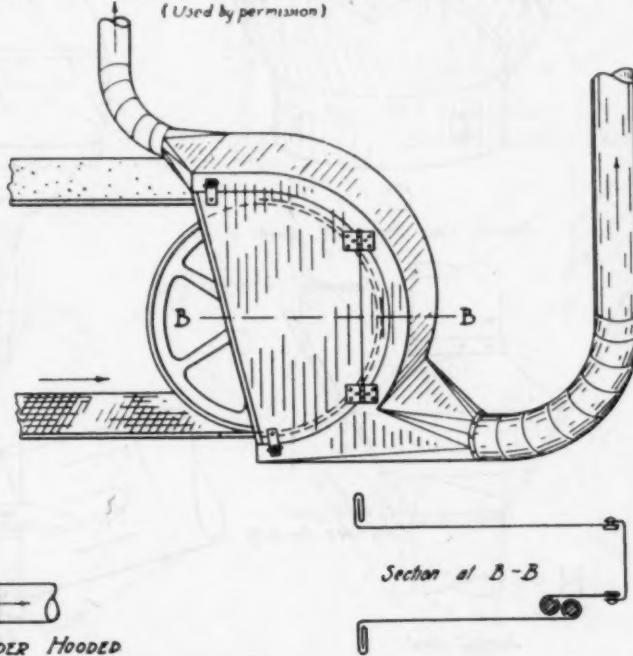


Fig. 71. Another type of belt sander.

TRADE DEVELOPMENT
COMMITTEE
NATIONAL ASSOCIATION
SHEET METAL CONTRACTORS

TYPICAL DESIGN OF SANDER HOODS
FOR WOOD WORKING PURPOSES

PLATE
NUMBER 30

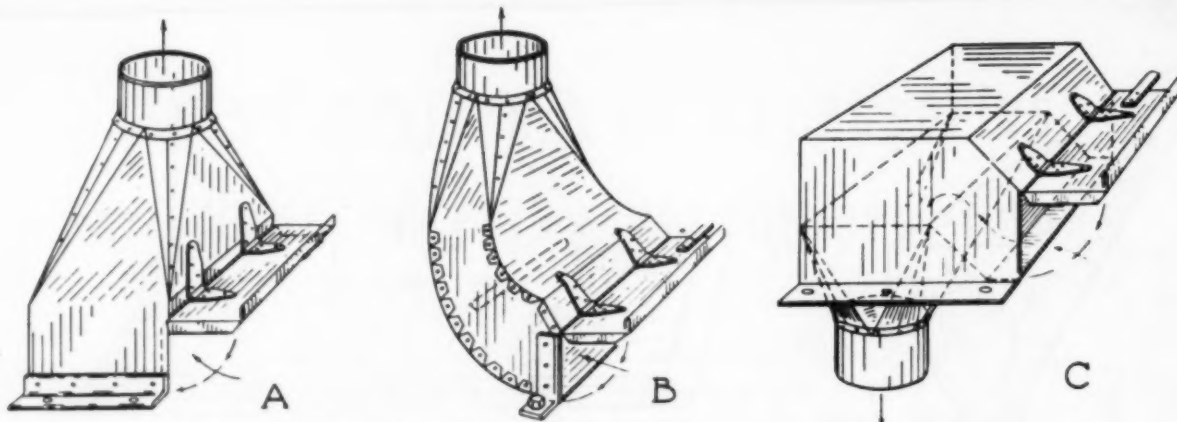


Fig. 72. Up Floor Sweeps.

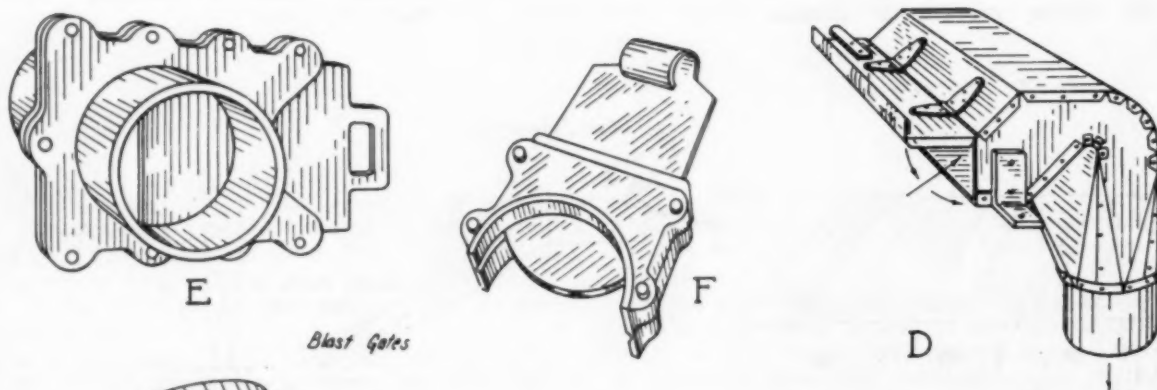


Fig. 73. Down Floor Sweeps.

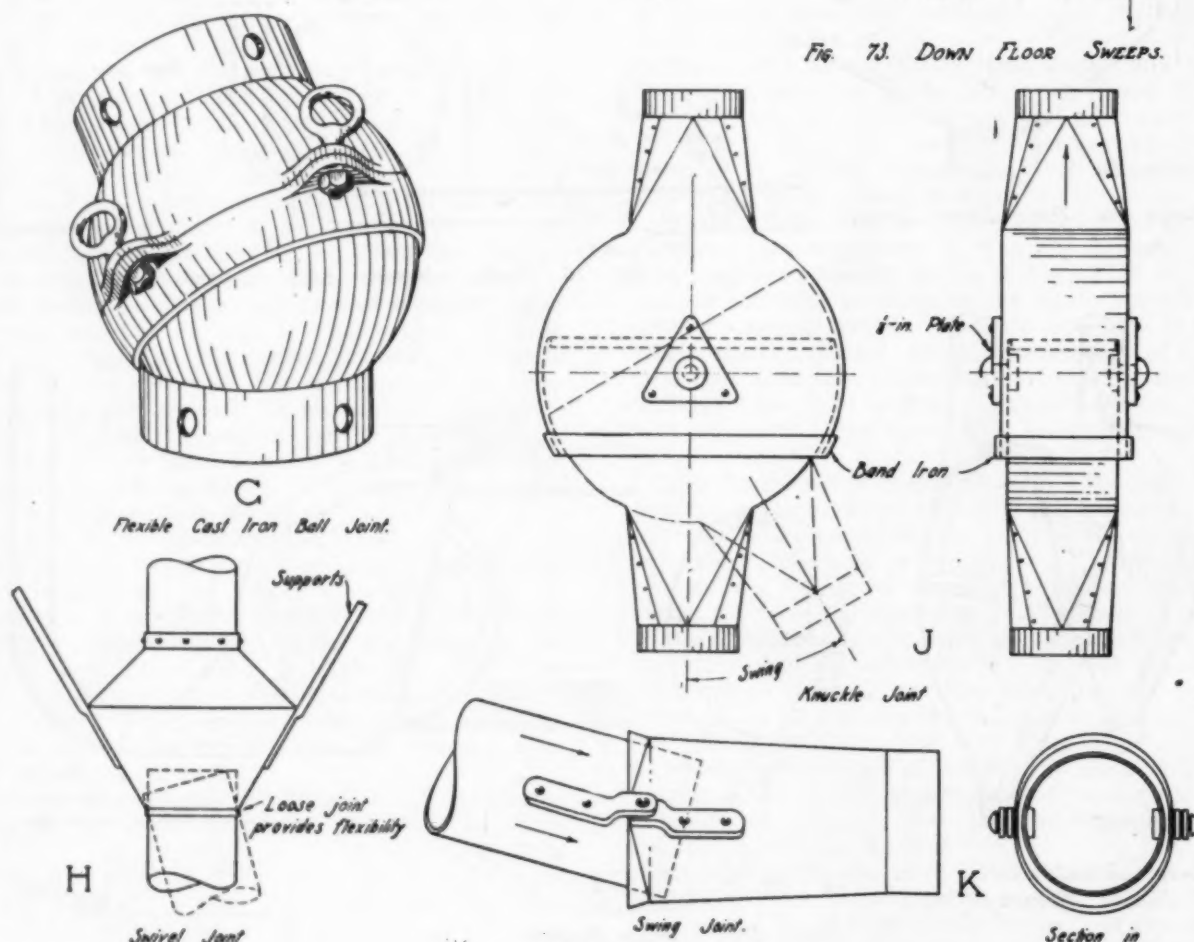


Fig. 74.

TRADE DEVELOPMENT
COMMITTEE
NATIONAL ASSOCIATION
SHEET METAL CONTRACTORS

TYPICAL BLOW PIPE
INSTALLATION ACCESSORIES

PLATE
NUMBER 31

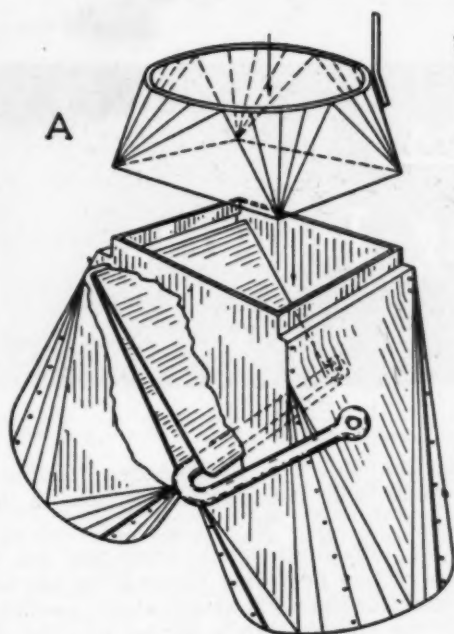


Fig. 75. STANDARD VALVE.

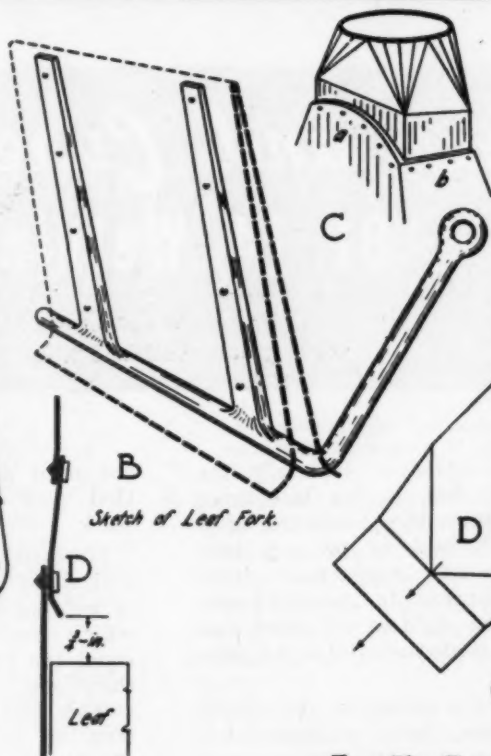


Fig. 76. TWO-WAY ANGLE VALVE.

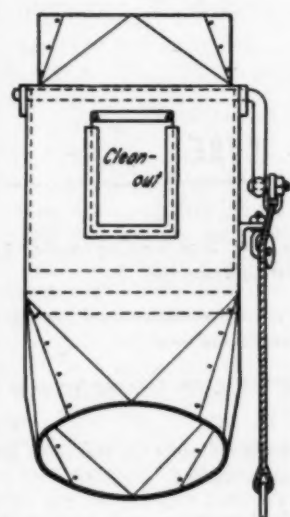


Fig. 77. STANDARD DOUBLE LEAF VALVE.

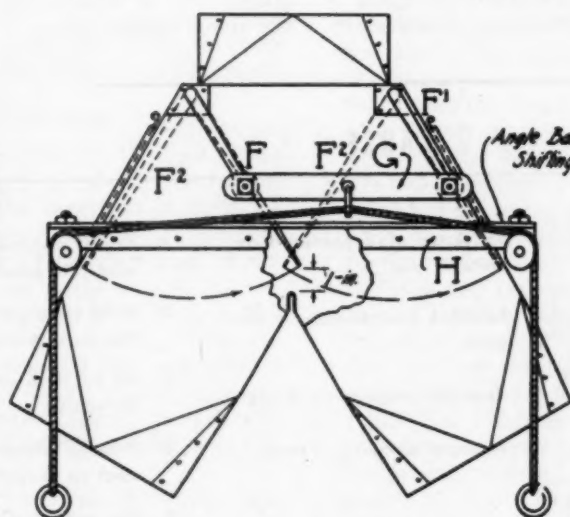


Fig. 78. THREE-WAY DOUBLE LEAF VALVE.

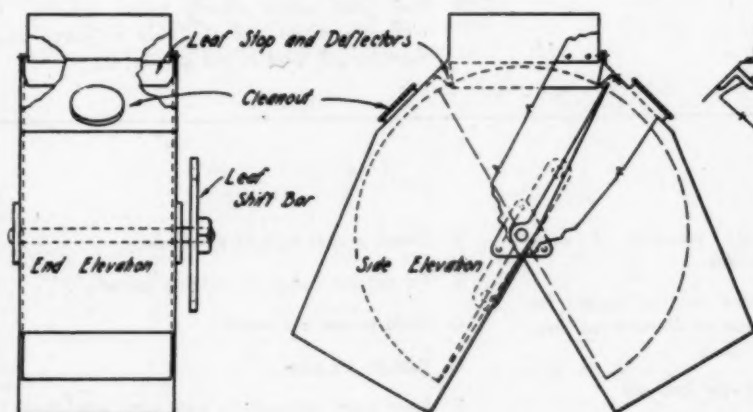
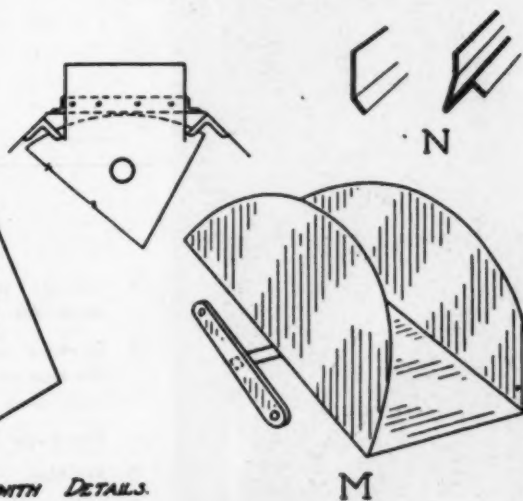


Fig. 79. DUMP VALVE WITH DETAILS.



Causes and Cures Of 14 Welding Troubles

By C. H. Jennings
Westinghouse Electric & Mfg. Co.

THE sheet metal contractor, especially the fabricator of war products, has, in the last three years, applied welding to procedures unheard of a short time ago. From such uses as joining light structural shapes and plate and, occasionally, light gauge sheet, welding has spread to include heavy structurals, heavy plate, the lightest of sheet and now covers practically every basic material and dozens of the alloys.

With this rapid spread of welding, it is natural that welding difficulties arise. Some of these difficulties seriously affect the strength and serviceability of the product, while others are less important and only influence the cost or appearance. Probably

the most serious objection to improper welding is that poor welds will not pass inspection in war work.

Most of the difficulties which arise are not too difficult of correction providing the welding operator or welding engineer has a knowledge of the conditions which cause the trouble. While no set of rules can equal the knowledge which a good welder possesses, there are certain basic suggestions which minimize trouble and make correction swift and simple. Fourteen of the more common welding troubles are illustrated by photographs and discussed from the standpoint of causes and methods of correction in the items which follow.

TROUBLE

CAUSE

CURE

Warping
(Thin Plates)



- A Shrinkage of deposited weld metal.
- B Excessive local heating at the joint.
- C Improper preparation of joint.
- D Improper clamping of parts.

- A Select electrode with high welding speed and moderate penetrating properties.
- B Weld rapidly to prevent excessive local heating of the plates adjacent to the weld.
- C Do not have excessive spaces between the parts to be welded.
- D Properly clamp parts adjacent to the joint. Use back up to cool parts rapidly.
- E Use special welding sequence; step back or skip procedure.
- F Peen joint edges slightly before welding. This elongates edges and the weld shrinkage causes them to pull back to the original shape.

Splatter



- A Inherent property of some electrodes.
- B Excessive welding current for the type or diameter of electrode used.
- C Excessively long arc.
- D Arc blow.

- A Select proper type of electrode.
- B Do not use excessive welding current.
- C Hold proper arc length.
- D Reduce arc blow.
- E Paint parts adjacent to weld with whitewash. This prevents spalls from welding to parts and makes removal easy.

TROUBLE

CAUSE

CURE

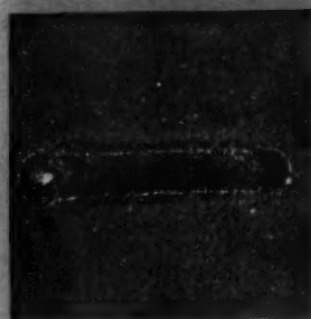
Distortion



- A Shrinkage of deposited metal pulls parts together and changes relative positions.
- B Non-uniform heating of parts during welding causes them to distort before welding is finished. Final welding of parts in distorted position prevents the maintenance of proper dimensions.
- C Improper welding sequence.

- A Properly clamp or tack parts to resist shrinkage.
- B Pre-form parts sufficient to compensate for shrinkage of welds.
- C Distribute welding to prevent excessive local heating. Preheating desirable on some heavy structures.
- D Removal of rolling or forming strains before welding is sometimes helpful.
- E Study structure and develop a definite sequence of welding.

Welding Stresses



- A Joints too rigid.
- B Improper welding sequence.
- C Inherent in all welds, especially in heavy parts.

- A Slight movement of parts during welding will reduce welding stresses.
- B Make weld in as few passes as practical.
- C Peen each deposit of weld metal.
- D Anneal finished product at 1100-1200° F. for one hour per inch of thickness.
- E Develop welding procedure that permits all parts to be free to move as long as possible.

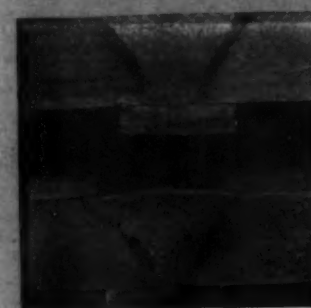
Poor Surface Appearance



- A Improper current and arc voltage.
- B Overheated work.
- C Poor electrode manipulation.
- D Inherent characteristic of electrode used.

- A Insure the use of the proper welding technique for the electrode used.
- B Do not use excessive welding currents.
- C Use a uniform weave or rate of travel at all times.
- D Prevent overheating of work.

Poor Fusion



- A Improper diameter of electrode.
- B Improper welding current.
- C Improper preparation of joint.
- D Improper welding speed.

- A When welding in narrow vees use an electrode small enough to reach the bottom.
- B Use sufficient welding current to deposit the metal and penetrate into the plates. Heavier plates require higher current for a given electrode than light plates.
- C Be sure the weave is wide enough to melt thoroughly the sides of a joint.
- D The deposited metal should tend to sweat on to the plates and not curl away from it.

TROUBLE

CAUSE

CURE

Undercut



- A Excessive welding current.
- B Improper manipulation of electrode.
- C Attempting to weld in a position for which the electrode is not designed.

- A Use a moderate welding current and do not try to travel too rapidly.
- B Do not use too large an electrode. If the puddle of molten metal becomes too large, undercut may result.
- C Excessive weaving will cause undercut, consequently it should not be used.
- D A uniform weave will aid greatly in preventing undercut in butt welds.
- E If an electrode is held too near the vertical plane when making a horizontal fillet weld, undercut may be obtained on the vertical plate.

Incomplete Penetration



- A Improper preparation of joint.
- B Use of too large an electrode.
- C Insufficient welding current.
- D Too fast a welding speed.

- A Be sure to allow the proper free space at the bottom of a weld.
- B Do not expect excessive penetration from an electrode.
- C Use small diameter electrodes in a narrow welding groove.
- D Use sufficient welding current to obtain proper penetration. Do not weld too rapidly.

Cracked Welds



- A Joint too rigid.
- B Welds too small for size of parts joined.
- C Poor welds.
- D Improper preparation of joints.
- E Improper electrode.

- A Design the structure and develop a welding procedure to eliminate rigid joints.
- B Do not use too small a weld between heavy plates. Increase the size of welds.
- C Do not make welds in string beads. Make weld full size in short section 8" to 10" long.
- D Welding sequence should be such as to leave ends free to move as long as possible.
- E Insure that welds are sound and the fusion is good.
- F Preheating parts to be welded sometimes helpful.
- G Prepare joints with a uniform and proper free space. In some cases a free space is essential. In other cases a shrink or press fit may be required.

Brittle Joints



- A Air hardening base metal.
- B Improper preheating.
- C Unsatisfactory electrode.

- A When welding on medium carbon steel or certain alloy steels the heat affected zone may become hard as a result of rapid cooling. Preheating at 300-500° F. should be resorted to before welding.
- B Multiple layer welds will tend to anneal hard zones.
- C Annealing at 1100-1200° F. should after welding will generally soften hard areas formed during welding.
- D The use of austenitic electrodes is sometimes desirable on steels which harden readily. The increase weld ductility compensates for the brittle heat affected area in the base metal.

TROUBLE

CAUSE

CURE

Porous Welds



- A Inherent property of some electrodes.
- B Not sufficient puddling time to allow intrapped gas to escape.
- C Poor base metal.
- D Too short an arc length.

- A Some electrodes inherently produce sounder welds than others. Be sure the proper electrodes are used.
- B Puddling keeps the weld metal molten longer and often insures sounder welds.
- C A weld made of a series of strung beads is apt to contain minute pinholes. Weaving will often eliminate this trouble.
- D Do not use excessive welding currents.
- E In some cases the base metal may be at fault. Check this for segregations and impurities.
- F Do not hold too short an arc.

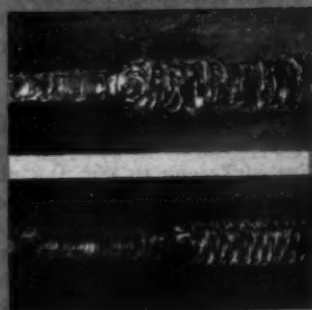
Corrosion



- A Type of electrode used.
- B Improper weld deposit for corrosive media.
- C Metallurgical effect of welding.
- D Improper cleaning of weld.

- A Bare type electrodes produce welds that are less resistant to corrosion than the parent metal.
- B Shielded arc type electrodes produce welds that are more resistant to corrosion than the parent metal.
- C Do not expect more from the weld than you do from the parent metal. On stainless steels use electrodes that are equal or better than the base metal.
- D When welding 18-8 austenitic stainless steel be sure the analysis of the steel and welding procedure is correct so that welding does not cause carbide precipitations. This conditions can be corrected by annealing at 1900-2100° F.
- E Certain materials such as aluminum require careful cleaning of all slag to prevent corrosion.

Irregular Weld Quality



- A Improper electrode manipulation.
- B Excessive welding current.
- C Welding in improper position for which electrode is designed.
- D Improper joint design.

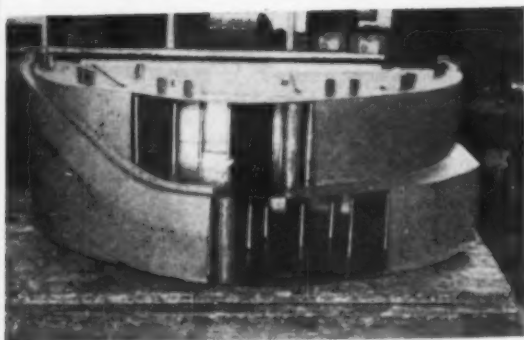
- A Use a uniform weave or rate of travel at all times.
- B Do not use excessive welding currents.
- C Use an electrode designed for the type of weld and the position in which the weld is to be made.
- D Prepare all joints properly.

Magnetic Arc Blow



- A Magnetic fields cause the arc to blow away from the point at which it is directed. Magnetic blow is particularly noticeable with d-c at ends of joints and in corners.

- A Proper location of the ground on the work. Placing the ground in the direction the arc blows from the point of welding is often helpful.
- B Separating the ground in two or more parts is helpful.
- C Weld toward the direction the arc blows.
- D Hold a short arc.
- E Change magnetic path around arc by using steel blocks.
- F Use a-c welding.



.50 Cal.

Ammunition Feeder Boxes



Above—Finished feeder boxes; below—Typical die set-up to provision one box piece.



UNITED STATES war planes, excelling all enemy's best in flight characteristics, also have dominance in that all important category—firepower. Ballistically, one single development in armament has given our planes superiority—the .50 caliber, high velocity machine gun—which in some fighters concentrate 5,100 rounds or 96,000 pounds of impact per minute.

But this firepower is useless unless the shells feed through the guns smoothly, without interruption, and are supplied in quantities sufficient to get the plane through the moments of intense firing with some ammunition to spare. That is the function of the ammunition "feeder boxes" or containers which in some gun positions are placed on the gun mount and in other positions removed from the gun, but connected to it by feeder chutes.

Allen Corp. Procedure

The Allen Corporation, Detroit, manufacturers of ventilation apparatus, has been making these feeder boxes for many months. The boxes made by Allen go into the belly turrets of bombers, are made of stainless steel and weigh 55 pounds empty. The production requires maintenance of precise limits in sheet metal forming and assembly—the feeder box must be as accurately made as the gun itself.

The accompanying photographs show feeder boxes in process of manufacture by Allen. Stated very roughly this item is largely a problem of provisioning in the flat and spot welding—much spot welding. To insure steady production, Allen engineers selected enough punches, presses and spot welders from the many machines in the big plant to maintain the production assigned and for these machines made up the necessary dies and fixtures. The box was broken down

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AMER
SHEET

into its several pieces and a schedule for each piece was worked out so that, at assembly, there would be enough pieces and sub-assemblies and not over-runs on some and not enough of others.

Dies were made for everything—this was possible because so much of the box is flat or formed from the flat and all notching, punching, etc., could be done by dies. Despite this extensive use of die work, each box still represents approximately 20 labor hours.

Because the material is stainless steel, die preparation required considerable trial and error to compensate for the "spring" of the steel, but once established the pieces flowed from the machines day and night.

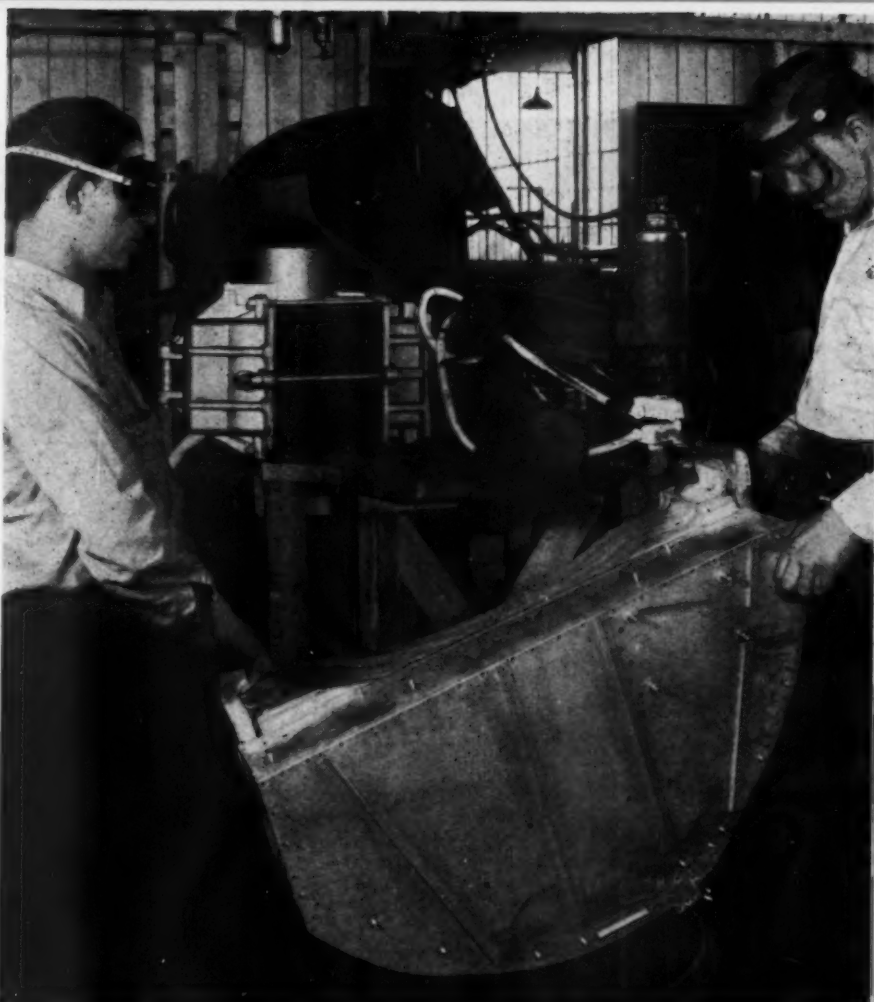
It has been stated that much of the work involves spot welding. The ammunition belt in one of these boxes is about 16 feet long and when loaded with shells is wound in and out of baffles which guide the belt as it is withdrawn, keep a tension on the belt and insure smooth feed without any "stoppages" no matter what the position of the plane. So inside the box there are baffles and partitions all spot welded to the box. On the outside are stiffeners and positioner strips and holding bolts—all these are spot welded. The box itself is put together by spot welding.

To speed production and insure accuracy, most of this spot welding in assembly is aligned by fixtures which hold pieces in proper position and eliminate all hand fitting. Many of the fixtures are so made that two or three spots position the piece so that the fixture can be removed and the remaining spots quickly made.

To obtain maximum production without delay for dressing electrodes or letting the electrodes cool down, refrigeration was used on some of the welders. This artificial cooling (AA, Feb., March, June, 1944) of electrodes materially increases the number of spots per hour, particularly in material like stainless steel. One of the photos shows a typical cooled spot welder in operation.

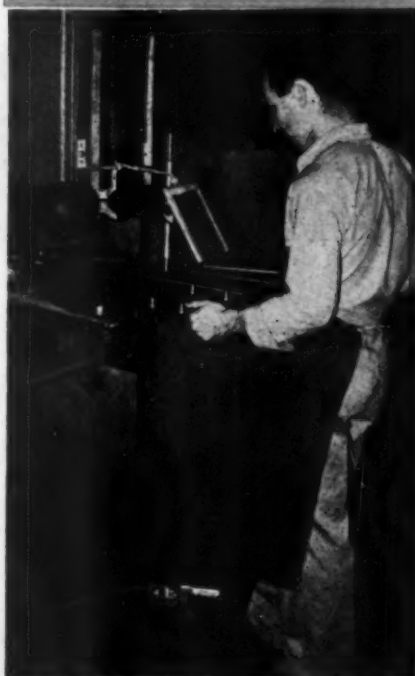
The Allen Corporation has also had in production during the past two years a number of other interesting war items. Two of these, the "power control breather tank" and the "gunner's turret floor assembly" are shown in photographs. The floor assembly is made of aluminum, embossed, riveted and welded and despite the thin mate-

(Text continued on page 227)



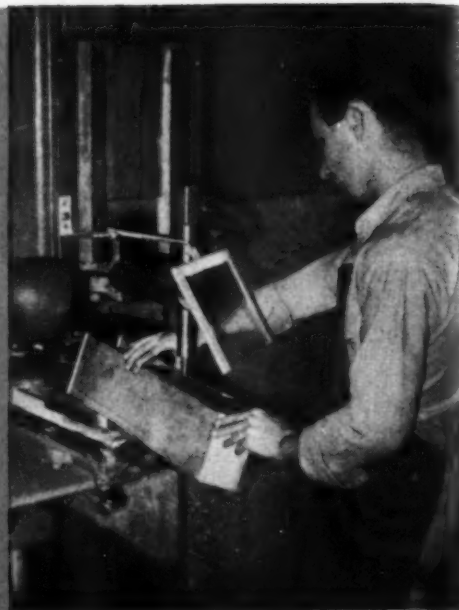
Above—Refrigeration used on spot welder to increase number of spots between dressings. Such modern methods made possible the steady production of a critical item.

Below, left—Spot welding "stiffeners" on a box back. Below, right—Allen's large battery of presses were equipped with dies so that many parts could be produced on schedule.





Spot welding a stiffening ring on the "gunners turret floor assembly"—this is aluminum, embossed, riveted and welded.



Spot welding a baffle assembly for the ammunition feeder box. Such sub-assembly procedure speeded up final assembly.



Group of "power control breather tanks" a small item, but very complicated and with very rigid tolerances.



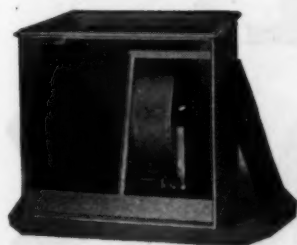
Constant checking by template insured exact location of critical bolt heads, cut-outs, etc.

Allen is best known for its peacetime ventilators and ventilating apparatus. Below is a large installation of industrial "Type H" ventilators.



Properaire AIR-MOVING EQUIPMENT

BLOWERS—EXHAUSTERS and FANS for



Furnace Blowers
Series 2000—
Insulated Package Units

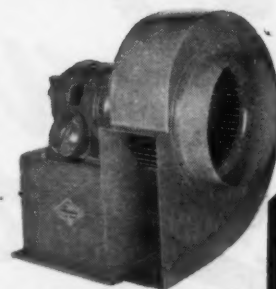
★ Homes

★ Stores

★ Offices

★ Factories

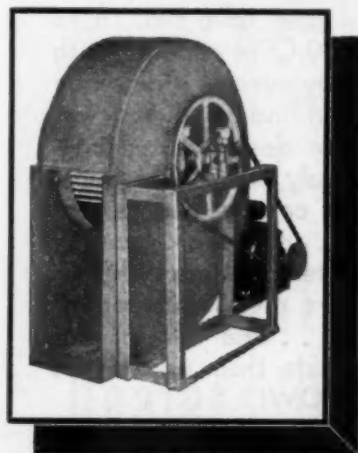
★ Institutions



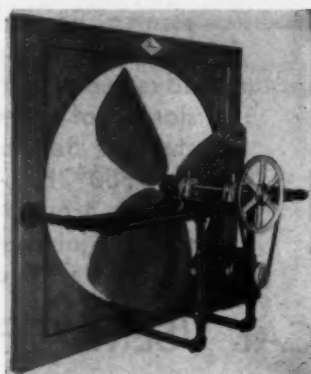
Type E
Direct Drive

The Properaire Line, a pioneer in the field, includes multiblade blower wheel sizes from 6 to 16 inches and propeller type fans up to 36 inches. Let us schedule your 1945 requirements.

Write for **FREE Engineering Data File**



Type EB
Exhaust Blower — Belt Drive

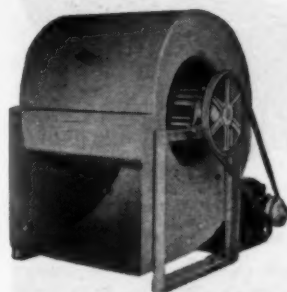


Exhaust Fans
Direct and Belt Driven —
Sizes up to 36 inches . . .
At left and below.

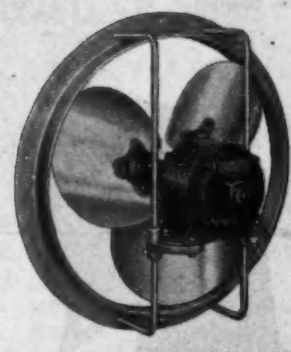
Manufacturers of Warm Air Heating and Air-Conditioning Equipment

will be interested in parts and assemblies, including blower wheels, housings, blades, motor brackets, general stamping and machine work.

Wheels in standard sizes from 6 to 16 inches, single or double widths. Send for Engineering Data.



"B" Assembly
Belt Drive



- Excellent Equipment
- Dependable, Skilled Labor
- Precision Work
- Moderate Cost Area

GRAND RAPIDS DIE & TOOL CO.

1202 Godfrey Ave. S.W.

Grand Rapids 2, Michigan

Bayley

"CUSTOM BUILT"

FANS



**Arrangement
No. 2**
Overhung blast
wheel and pul-
ley, regularly
equipped with
roller bearings.

Bayley "Ex" Exhaust Fans, custom built to meet the individual needs of industry, are without a doubt the most advanced, efficient and durable fans available. Built in standard sizes from No. 15 to No. 80 and from 200 to 30,000 CFM capacity with pressures up to 15" W.G., they cover a wide range of applications in all types of industrial and war plants. Bayley "Ex" Fans are designed and constructed to operate faultlessly under the most adverse conditions . . . they can be made explosion proof . . . non-ferrous . . . and are produced in stainless steel to handle high temperature gases up to 1600° F. Bayley Blowers give assurance of lasting, trouble-free service . . . and will do your specific job better. Investigate their possibilities for your particular purpose NOW!

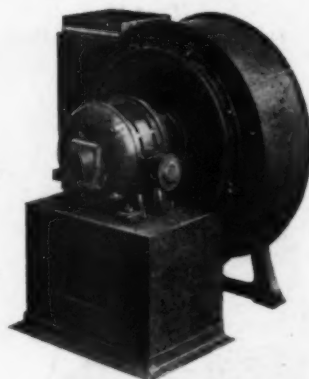
TYPICAL USERS OF BAYLEY PRODUCTS



Arrangement No. 1
Overhung blast wheel, pulley drive, regularly fitted with ring oiling bearings. (Ball bearing optional)

Allis-Chalmers Mfg. Company
The American Monorail Company
Armour & Company
The Borden Company
Briggs & Stratton Corporation
Carnegie Illinois Steel Corporation
Chrysler Corporation
Cleaver-Brooks Company
The Day Company
Despatch Oven Company
Diamond Iron Works, Incorporated
And the Mahr Mfg. Company
Division
The Dow Chemical Company

Dravo Corporation
Ford Motor Company
Harnischfeger Corporation
The Heil Company
Marquette Cement Mfg. Company
Nash Kelvinator Corporation
The Pennsylvania Railroad Company
Phoenix Hosiery Company
A. O. Smith Corporation
A. E. Staley Mfg. Co.
Swift & Company

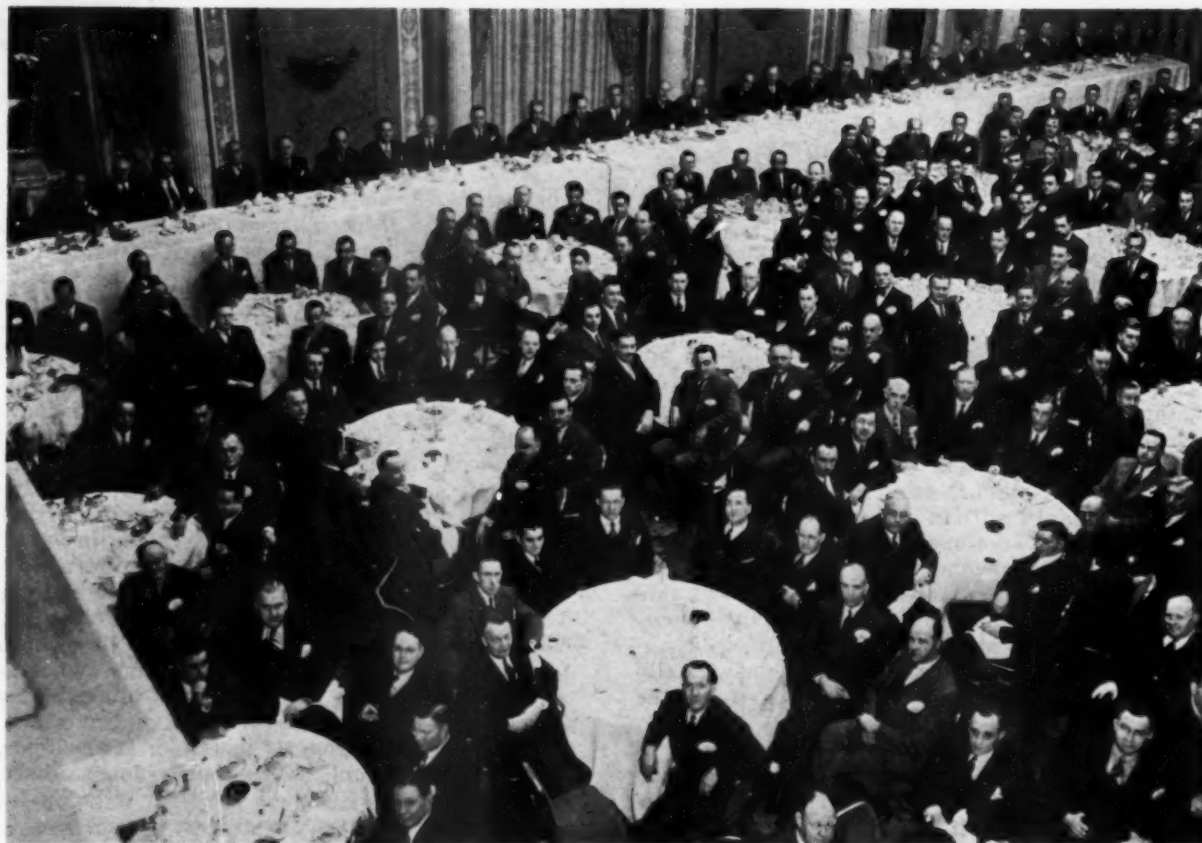


Arrangement No. 4
Housing, wheel and motor sub-base only for direct motor drive.

CONSULT US ON YOUR ENGINEERING PROBLEMS
BAYLEY BLOWER CO.

1817 SOUTH 66TH STREET

MILWAUKEE, WISCONSIN



Part of the overflow luncheon hears 'Red' Motley describe the steps manufacturers should take to prepare for post-war competition.

National Advertising Program Endorsed, Dealers Division Formed by NWAH&AC Ass'n.

TWO far-reaching warm air heating industry projects were launched at the 31st annual meeting of the National Warm Air Heating and Air Conditioning Association in Cleveland on December 13 and 14. Of first importance was the enthusiastic endorsement of the industry's \$200,000 national advertising campaign to cement, and advance the acceptance of warm air heating in the postwar era. Secondly, and intimately connected with the national advertising campaign, was the formation of a new dealers' division of the association, open to every warm air heating dealer who wishes to participate in the national advertising campaign and in the numerous proposed dealer activities of the association.

The reason for, and the results to be expected from, the proposed national advertising campaign were succinctly outlined by President Mueller in his president's report when he said—"One of our biggest objectives must be to obtain greater public acceptance of the beneficial results that can be provided by the installation of warm air heating equipment. We have already attained a high degree of public acceptance for our products, as a result of the increased usage of warm air heating

in the last ten or fifteen years, but we must continue to keep the advantages of our type of comfort heating ever before the public. We must tell the public that we have a superior product that will achieve superior results. By selling the results that we provide, we place ourselves in a better position to obtain a larger share of the public building dollar and we can be assured that more people will purchase the products of our industry instead of buying other home appliances, conveniences and luxuries.

"We must build a sound selling and advertising program for our industry and we must individually and collectively build sound selling programs. An advertising and a sales promotion program unprecedented for this industry has been organized during the past year. We urge your support of this program by subscribing to it and actively promoting it. The entire industry must tie in their consumer advertising with the common message that is suggested in the proposed national advertising program. To reap the full benefit of participation in this campaign, it will be necessary for each individual dealer to carry on local advertising to identify himself with the national program. By conveying such a common message, and by repeating it over and over again to

the public and to the building industry, through these proposed various channels, a tremendous influence will be brought to bear in the minds of millions of people as regards the importance of properly conditioning and handling the air they breathe, to attain indoor comfort."

Outline of Advertising Program

As explained in the November and December issues of AMERICAN ARTISAN, this national advertising campaign proposes active participation by a jobbers' division and a dealers' division, who will subscribe certain funds to the campaign, and will, as described by President Mueller, co-operatively add to the cumulative effect by proper local advertising over their own signatures. As explained in American Artisan, the \$200,000 for the campaign is to be pledged by manufacturers, jobbers and dealers. Several thousand manufacturer, jobber and dealer subscription blanks with a brochure explaining the proposed program were mailed out shortly preceding the convention and reached most readers one week to ten days prior to the convention. In spite of this relatively short time in which to digest the importance of the proposed program, the proposed national advertising campaign was enthusiastically received and endorsed by representatives at the meeting.

Well up toward one-half of the total amount of money desired was pledged or paid by the conclusion of the convention. To obtain the remainder of the necessary funds, a mail and personal solicitation campaign has been launched and will be actively promoted during the coming weeks so that, if possible, the necessary money will be obtained to launch the program whenever space can be purchased in the magazines selected and the vast amount of material required can be prepared.

Scott Explains Need for Advertising

J. R. Scott, chairman, Publicity and Merchandising Committee, explained briefly the background history of the campaign and the various steps which have been taken to insure success. Chairman Scott explained that it is expected after the war all sorts of industries will solicit the home owner's dollar—

he will be asked to buy a new automobile, radio, and dozens of other highly necessary products of American industry—so our job is to convince the home owner that warm air heating or winter air conditioning for indoor comfort is more necessary to the owner's comfort and convenience than a new automobile, radio, or refrigerator. Briefly, this is the purpose of the national advertising campaign. The basic purpose of the national advertising campaign is to sell the idea of indoor comfort through warm air heating. After that job is done, the particular product or the services of a particular dealer must be sold by that manufacturer or that dealer in additional advertising effort.

Chairman Scott explained that the purpose of the campaign must be two-fold. First, it must convince owners, architects, and builders that indoor comfort with warm air heating is not only desirable, but absolutely necessary in all new houses. Secondly, the owner of an old house must be convinced that he should modernize his heating system in order to obtain and enjoy the true indoor comfort which can come only with modern warm air heating equipment. This, said Chairman Scott, is an old, old story to each of us in the industry, but it will be brand-new to many architects, builders and home owners, and we must, by telling the story over and over again impress on the buyer the desirable characteristics of warm air heating properly installed. \$200,000 should be only a minimum starting program, said Chairman Scott, and we should hope for a much larger National advertising campaign in future years and we should be ready to have local advertising campaigns by dealers and jobbers and manufacturers tie in with the national effort.

Dealer Division Formed

As announced in the November and December issues of American Artisan, it is recognized that no such national advertising effort can hope to attain its maximum effect unless and until the warm air heating dealer is an intimate participant in the program. Such active participation can best be obtained when the dealer is a member of the National Warm Air Heating and Air Conditioning Association, so as a part of this far-reaching post-



One of the general sessions listening to Voorhees and Konzo describe the new engineering standards. Total registration 599—largest convention yet held.

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The dealers' meeting—192 dealers attended to hear about the proposed national advertising campaign and formation of a "dealers' division."

war program, a new dealers' division was carefully planned. Prior to the meeting, several thousand letters and brochures were mailed to dealers all across the country. Special letters of invitation to attend a pre-convention meeting of dealers were also mailed.

As a result of this invitation 192 dealers attended the Cleveland meeting despite some of the worst possible winter weather at the time of the convention. These dealers endorsed both the national advertising campaign and the proposed dealers' division. Steps were taken to organize this dealers' division and the following officers were elected—as Chairman of the dealers' division, Hugh Thompson, Thompson Heating Corporation, Cincinnati, Ohio. As members of the executive committee—George Kalvog, Austin Sheet Metal Works, Chicago; Homer Selch, Indianapolis, Indiana; Michael Devino, Devino Company, Waterbury, Connecticut; Elmer G. Schartow, Schartow Service, Midland, Michigan; Dan Schmidlin, Schmidlin Brothers Heating Co., Toledo, Ohio; Jack Stowell, Aurora, Ill.; R. S. Turnbull, Turnbull Heating Co., Detroit, Mich.

Typical Dealer Comments

Following are some typical expressions of opinion on the need for such a new dealers' division—said Mr. Thompson, "The emblem of the National Warm Air Heating and Air Conditioning Association should stand for compliance with the various industry codes which the industry has worked so long to establish and publicize. To participate in this dealer division will cost something, yes, but the cost will be insignificant in comparison with the potential returns. A most important part of this program should be a complete setup to carry education in proper design and installation to every dealer in even the smallest community."

Dan Schmidlin said he considered this proposed advertising campaign to be the most wonderful opportunity yet offered warm air heating dealers. But to be a success it will require the cooperation of every progressive dealer in the country. The dues should be high enough to interest the "big" fellow, but should also be low enough to attract the installer of 10 to 20 furnaces a year. No matter how much or how little a dealer contributes, said Dan, he should get repaid a hundred fold—especially if the dealer will tie his own local advertising into the national program.

Ray Turnbull reported that the Detroit association

had discussed the merit of this proposal and believed that the program is soundly conceived and badly needed. Detroit is for the program 100 per cent.

Harvey Manny said this proposed program is a chance to educate the public in the benefits and advantages of winter air conditioning by warm air heating, but to insure success, the program will require the active participation of every manufacturer, jobber and dealer.

Jack Stowell pointed out that this program has been needed for a long time, but that the basis for such a program was set up almost 20 years ago when a dealer division was organized and attempts were made to launch a national advertising program. So this present effort is only the culmination of 20 years of effort and is not something brand-new or untried. If the proposed program is put into effect it should establish a sound basis of operation on which every warm air heating dealer in the country can capitalize.

Michael Devino said that for many years he has been attempting to establish warm air heating and winter air conditioning in a territory which has been wet heat since the turn of the century. It has been a long hard battle, but substantial progress has been made and any such effort as the proposed national advertising campaign should speed up public acceptance tremendously. Every dealer should be proud that he is a member of the warm air heating fraternity, and he should use every possible effort to publicize the advantages of winter air conditioning with warm air. Advertising, such as this proposed program, will solidify our position and will insure the success of warm air heating in the postwar period.

Homer Selch said that this campaign needs the active cooperation and participation of every warm air heating dealer in the country. The results will benefit every dealer whether he participates or not but every dealer should be so proud to be a part of this industry that he will immediately want to participate financially and cooperatively.

George Kalvog explained the many discussions which had taken place in Chicago on the subject and announced that the Chicago associations and dealers are behind the program almost 100 per cent.

Gene Droegkamp of Milwaukee said in his opinion this proposed advertising and educational campaign will be of even more value and direct benefit to dealers than the 20 years of research which has done so

much to elevate and standardize the design and installation of warm air heating equipment.

Don Fisher of Cleveland said there is a distinction between a warm air heating dealer and a sheet metal contractor and there are many dealers who do almost no sheet metal manufacturing or contracting. Cleveland has approximately 400 such contractors and several years ago organized a warm air heating dealers association with eleven men which was eventually built up to a membership of approximately 250. This Cleveland association organized schools and did cooperative advertising and policed installations to insure proper design and installation. The Cleveland program magnified to national proportions presents no more difficult problems than the Cleveland situation and, accordingly, can just as easily and as quickly be put into effect.

Rudy Guenther of Chicago said that some of the Chicago associations feel there should be a place for the smaller dealer with a proportionately lower membership fee than the proposed minimum \$50, but that regardless of dues many Chicago contractors will wholeheartedly endorse and participate in this proposed program.

Elmer Scharrow pointed out that after the war there will be many associations trying to enlist the support of warm air heating dealers. Therefore, it might be feasible to add a lower dues bracket for smaller dealers. He also pointed out that mere membership in the dealers' division is no guarantee of proper design and installation, therefore a major endeavor of the proposed dealer division should be to educate the dealer in proper design and installation and there should be set up local or regional committees to police design and installation and to make sure that participating dealers will live up to the various regulations proposed in the campaigns.

Martin Schaar of Milwaukee said this proposed advertising campaign will insure our getting our proper share of the consumer's dollar after the war.



Jobbers in attendance organized a "jobbers division" to participate in the national advertising program.

Rex Balfour of Anderson, Indiana, said he thought consideration should be given to the small dealer who installs fewer than 50 furnaces a year and perhaps one smaller dues bracket should be included.

As the typical expressions above indicate, there was practically unanimous opinion in favor of the national advertising program; however, the question of the need for a dealers division as a new association was raised by several contractors. The gist of this objection was whether or not the present National Association of Sheet Metal Contractors, having a warm air heating dealers division, might

not serve just as well as a new organization. Several contractors thought such cooperative effort should be looked into and might avoid competition and establish one strong organization with ultimate greater success than two associations.

As readers of American Artisan who received letters announcing the meeting know, a large share of the ground work which preceded this meeting was done by Harvey Manny of the Robinson Furnace Company, Chicago. Mr. Manny presided as temporary chairman over pre-convention meetings and explained just what the purpose and proposed set-up was. He also personally sent several scores of letters to interested contractors around the country suggesting attendance at the convention.

Jobbers Division Also Formed

Since jobbers participation in the proposed campaign is also essential, another meeting was held during the convention for the purpose of permitting jobbers to organize a jobbers' division.

Such a jobbers' division was organized with H. S. Sharp of the Sharp Heating & Supply Company, Cleveland, chairman and A. A. Anderson of Anderson & Krapp, Toledo as vice-chairman. Arthur Vorys of Vorys Brothers, Columbus, Ohio, was elected secretary. Directors are: R. W. Becker, Ohio Valley Hardware & Roofing Co., Evansville, Indiana; J. J. Moran, Baker Specialty & Supply Co., Logansport, Ind.; Arthur Johnson, A. H. Johnson Co., Pittsburgh, Pa.; Oscar Brauer, A. G. Brauer Supply Co., St. Louis, Mo.; Leo O'Connor, O'Connor Steel Company, Akron, Ohio; John Phillips, Stelwagon Manufacturing Co., Philadelphia; Fred Green, Des Moines Stove Repair Co., Des Moines, Iowa.

The editors regret that it was not possible to attend continuously the jobbers' meeting, but the jobbers did organize a jobbers division of the association and appointed committees of the membership as a whole or selected groups to determine the various needs of a jobbers' division. For example, one committee will define a jobber and establish a jobbers' status. Another committee will determine a preliminary constitution and by-laws. It is hoped that a meeting of the officers and directors can be held as soon as possible to accept the recommendations of the committee and to start a jobbers' division functioning as an active body.

Participation in the proposed national advertising campaign on the schedule of dues announced previously was unanimously accepted by the jobbers in attendance and efforts will be made immediately to enlarge and increase the membership to contain all the active warm air heating jobbers in the country.

Future Heating Market

In addition to these important accomplishments, the two-day program was replete with important addresses and reports. C. E. Price, General Manager, Keeney Publishing Company, presented an illustrated discussion of the postwar dealer situation and the postwar building and heating market. This report, with the illustrations used, is reproduced on other pages of this issue.

The guest speaker at the luncheon, A. H. (Red) Motley, publisher, American Magazine, delivered a stimulating post-war message which, rudely stripped of its many humorous stories, boils down to this—every producer of equipment to be used in the post-war market should have underway now a definite program of planning so that shortly the manufac-



Above—Board of Directors in session; below—the Codes Committee makes final approval of new engineering literature.



Above — Michigan Short Course committee hears plans for 1945 school. Left—Publicity and Merchandising Committee which launched advertising program. Below—Technical Advisory Com.



Most of the work of the association is done by these hard working committees—two are not shown; the Membership Committee and the Traffic Committee.

turer will know what type of products he proposes to manufacture and sell; he will be sure that his product has sales appeal and a market; he will have a plan for selling or distribution; and, so far as he is able, he will push postwar planning aggressively in the months ahead. Mr. Motley warned that competition in the postwar era will be intense regardless of products; this competition will not be just between comparable products in the same field, but will be between different types of products such as heating equipment vs. radios and refrigerators, etc. High up on the list of things which must be done is a plan to obtain good sales material and train this sales material so that the sales force will enthusiastically and intelligently distribute the vast flood of products which will roll off of practically every assembly line. Mr. Motley emphasized that production is no longer a problem in American business, but salesmanship will practically have to start at scratch after the war. So far as the proposed national advertising campaign is concerned, Mr. Motley reminded his audience that good products and adequate production and even an intelligent sales force will not be sufficient in themselves to insure markets after the war, but that all products and all industries will have to tell a continuous and intense sales story by way of advertising to the American public. Our industry's proposed advertising campaign is a definite step in this direction.

Carney—Boost American Business

R. W. Carney, general sales manager, The Coleman Lamp & Stove Company, pointed out that American households have gone from the broom to the

vacuum cleaner; from the flat iron to the electric mangle; but in more than one-half of the homes now in use, there are still civil war heating stoves and furnaces in daily use. The Coleman company proposes mass production at the lowest possible price of the best possible modern types of heating equipment. Manufacturers of furnaces should not worry about competition from other furnace manufacturers, but should worry mostly about competition from automobiles, radios, refrigerators, etc.

The chief point of Mr. Carney's address was that American business men individually have done an excellent job of selling their product to the consumer, but individually and collectively have done a mighty poor job of selling American business as an institution to the American public. Certain new deal agencies in Washington have seized this situation to convince American citizens that there is a certain stigma attached to big business and have made wide use of such phrases as "vested interest" or "humanitarianism" which properly defined are perfectly acceptable to the American citizen, but when snidely presented assume a meaning which definitely tags American business as undesirable and grasping. We are now facing, said Mr. Carney, and we will face postwar problems of government ownership vs. private enterprise. We have right now an American version of national socialism, which up-to-date has been handled with gloves, but which can quite easily become a rule by a few who never have managed a business and who do not believe in the incentive system. As a result of handing over to government some ten years ago control of many American manufacturing and business ac-

tivities, we now find ourselves in the situation where we cannot definitely separate business from politics because any type of business operation directly conflicts with the regulations of some Washington agency.

Kiss—"Capsule" Psychology

J. Archibald Kiss, Phil Gordon Advertising Agency, presented a discussion of psychology in business in capsule form. Some of these capsules were—the postwar era will offer only *opportunities*; not a readymade market. 130,000,000 people will not say after the war, "Give it to me," but will have to be sold through intensive salesmanship and advertising. A million people have visited certain model homes, yet all but ten out of the million will go home and put up with the same old living conditions. Postwar plans consisting of engineering and blueprints are only what we *hope* and *think* people will buy; what we sell will depend upon our salesmanship. There will be more old people after the war and these old people want comfort, so anything which contributes to the comfort of living will have a definite sales value. Women now working in war plants are learning all about machinery, materials and fine mechanisms and they will both appreciate and demand such mechanisms and materials in the products they buy postwar. People don't want *things* as such, but they want the comforts or conveniences which these things bring. A case in point is the fact that people do not buy toothpaste as toothpaste, but they buy glamor; they do not want a furnace as a furnace, but they want the comfort and convenience which modern heating equipment insures. Advertising postwar should seek to glamorize, dramatize or publicize or add mystery or instill desire in the prospect.

Sedgwick—Research Program

The technical sessions of the convention emphasized our industry is on its toes to announce improved products, and to insure better engineering and better installation.

F. G. Sedgwick, chairman of the Research Advisory Committee, reported that the fuel savings made possible through insulation and storm sash are being studied again this winter to determine just what these savings are. A new furnace rating formula. (See AA, September) has been adopted. A very extensive program of research is under way at Battelle Memorial Institute on bituminous coal burning equipment. Final tests are also being conducted on the Fellow's smokeless furnace. During the winter it is expected that tests will be run on methods of heating basement rooms; perhaps some preliminary tests on panel or slot type heating systems; and further tests will be conducted on the proposed rating formulas.

Kratz—Furnace Rating Formula

Prof. A. P. Kratz explained some of the history which preceded the furnace rating formula. Our present established formula for rating coal burning equipment, underrated furnaces with high heating surface to grate area ratios and overrated furnaces with small heating surface to grate area ratios. The formula also is not sufficiently accurate for stoker fired furnaces. An explanation of the new rating formula and its effect on industry sizes will be reported in a later issue. For the present, however, it

Officers for 1945

The same officers as served during 1944 were again elected. These officers are:

H. P. Mueller, L. J. Mueller Furnace Company, President

F. E. Mehrings, The Meyer Furnace Co., 1st Vice President

C. Ackerson, The Agricola Furnace Company, 2nd Vice President

George Boeddener, Managing Director and Treasurer

Some minor changes were made in the membership of the various active committees.

is sufficient for dealers to recognize that the new formula and the old formula are only approximately ten per cent apart for furnaces having ratios of 16 to 1 to 22 to 1. Prof. Kratz also stated that the existing formula has given too much credit to attached or welded fins—this will be amended in the new formula.

Voorhees—New Data Sheets

G. A. Voorhees, sales manager, Hall-Neal Furnace Co. and co-author with Prof. Konzo on the first three sections of the new warm air heating text book, distributed new information blanks and explained the details of these blanks. He emphasized that a girl in the office can fill in most of the information required to engineer a heating installation. Mr. Voorhees also distributed sections I and II of the new text book and the new work sheet—the new sections are simple enough for understanding by high school students, and the new work sheet is expected to save considerable time in engineering. Mr. Voorhees said the Committee hopes that all manufacturers will recommend and all dealers will adopt the new information blank, the new work sheet, and the new method of designing and installing gravity and winter air conditioning systems as detailed in the Gravity Installation Manual and the new Code and Manual for the Design and Installation of Winter Air Conditioning Systems.

Konzo—New A.C. Manual

Prof. Konzo distributed the new Code and Manual for the Design and Installation of Warm Air Winter Air Conditioning Systems. It has required almost two years of work to prepare this new manual and at least 150 men have contributed their ideas and time to the work. Many groups like the manufacturers of mineral wool, the blower manufacturers, the humidifier, control, filter and gas furnace manufacturers have also been invited to contribute ideas and recommendations have been followed. Finally, fifteen key men have handled some 12 to 15 questionnaires relating to the manual and the finished job is a cross-section of the recommendations of these key individuals. It is hoped that this new manual will standardize design and installation practice and will do away with the dozens of methods which are now in existence. Prof. Konzo then briefly reviewed various sections of the new manual and explained how the tables and charts were established and emphasized how the use of the new manual will simplify engineering and save time.

(Continued on Page 196)



Interior of the Revere Sheet Metal Research Laboratories at Rome, N. Y., showing two 65-foot box gutters — replicas of actual installations — during a six-minute testing cycle under twin rows of 250-watt heating lamps. The gutter contracts and expands during a temperature change of 160 degrees.

This picture will mean a lot to you

Here is a photograph of one of many laboratory tests conducted by Revere during the past three years to determine if the usual methods of specifying and installing sheet copper for gutters, roofing and the like, were the best that could be devised.

Result: some radically new ideas were developed on the specification and application of sheet copper on buildings for new construction and repairs.

The information thus obtained is now being compiled and when ready will be made freely available to all metal workers. You will find it invaluable, because it reduces sheet copper con-

struction to a matter of engineering design, assuring satisfactory performance. On request we will put your name on our list to receive a complimentary copy of a forthcoming new Revere manual for architects and workers in sheet copper. Write Revere Executive Offices.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

Executive Offices: 230 Park Ave., New York 17, N. Y.

ASSOCIATION

Activities



Indiana

The preliminary program of the 27th annual state convention of the Sheet Metal and Warm Air Heating Contractors' Association of Indiana to be held at the Hotel Antlers, Indianapolis, on February 13th, follows:

Tuesday Morning, February 13
Registration 8:30 to 9:15 a. m., Fee \$5.00
Admission to Sessions by Badge Only
Door Prizes Awarded at Each Session

PROGRAM

9:45 a. m.—Convention called to Order.
Welcome, President Frank G. Sink
"Doodling Is Fun—But, Do It on Sunday," by Joe Wilder, Editor of "American Artisan"
"Selling Our Way to Success," by R. A. Dadisman, American Rolling Mills
"New Trend in the Installation and Control of Forced Warm Air Systems," by John W. Norris, Vice-President Lennox Furnace Company.
"Your Chance for More Steel in 1945," by Burton L. Wolff, Vice-President Benjamin Wolff & Company.
"Question Box—Report of Committees—Door Prizes," in charge of Herman W. Schmidt, President of Indiana Furmets
Buffet Luncheon 1:00 to 1:30 p. m.
Courtesy of Associated Members
1:30 p. m.—Convention called to Order.
Introducing New Officers and Directors 1945
Introducing National Officers (Subject to be selected), by Wm. T. Miller, Research Professor in Heating and Ventilating of Purdue University
"Indiana Tax Changes: State Building Code Revisions," by Clarence T. Myers, Secretary of Construction Industry
"Progress in Welding in Sheet Metal Shops," by J. R. Wirth, President Welding Society; Process Engineer Delco-Remy, Anderson, Indiana
"Story of Modusflow" (Movie), by Chas. F. A. Locke, Minneapolis Honeywell (Subject to be selected), by Ed. C. Carter, Editor of "Snips."

Business session and election of officers will be at 4 p. m. on Monday, February 12th, followed by dinner to members only. However, all who register on Monday afternoon may attend the dinner at 6 p. m.

Annual State membership dues are \$7, which includes registration, dinner at 6 p. m. on the 12th, badge, and noon luncheon on the 13th. Registration fee will be \$5 which includes your badge, noon luncheon and the benefits of the convention. Those who register on Monday, the 12th or previously, are heartily welcomed to attend the business dinner at 6 p. m. Or, mail \$7 and become a regular state member. Be Alive in '45. Drop a postal card right away to

FRANK G. SINK, President,
621 E. Ohio St., Indianapolis 7.

Illinois Retailers' Occupation Tax Liability

Sheet metal and furnace contractors were reclassified by the State of Illinois to be classed and called "Construction Contractors" according to W. R. Shaw, secretary of the Sheet Metal Contractors Association of Illinois. Mr. Shaw calls attention to Rule No. 6 defining construction contractors and Rule No. 13, covering vendors of portable ventilating equipment and trade fixtures. Both are available from the Retailers' Occupation Tax Division, Department of Revenue, State of Illinois, Springfield.

Rule No. 6 states that a construction contractor as defined incurs Retailers' Occupation Tax liability when he sells tangible personal property "over-the-counter" to

purchasers for use or consumption, apart from his rendering of service as a construction contractor, or when he furnishes personal property and services when not acting as a construction contractor.

A construction contractor does not incur Retailers' Occupation Tax liability measured by any of the receipts which he realizes from his rendering of services, or furnishing of labor, or furnishing of materials, as materials are defined in Rule No. 6, in the course of or as a part of his work as a construction contractor.

As an example, if the sale and installation of a portable ventilating unit to a person for use or consumption, installing the ventilating unit for the purchaser by merely connecting it to electrical wiring or to pipes already in the structure, the vendor is not acting as a construction contractor, and in such cases he incurs Retailers' Occupation Tax liability. However, in the same illustration, if the sale and installation are made as an incident to the vendor's contract to construct and equip a structure or building, or a part or system thereof, or if, in order to make the sale and installation, the vendor must furnish and install or cut, trim, shape, thread or fit some or all of the electrical wiring or the pipes already in the structure which are necessary for the operation of the stove or ventilating unit, then the vendor is acting as a construction contractor, and in such cases he does not incur Retailers' Occupation Tax liability.

Wisconsin

Arrangements for the annual convention of the Sheet Metal Contractors Association of Wisconsin, Inc., to be held February 5 and 6, 1945, are almost complete. The speakers are:

Modern Electrical Marvels—W. H. Wagner, Industrial Heating Engineer, Wisconsin Electric Power Company.
Gas Heating—Present and Future—B. T. Frank, Vice President, Milwaukee Gas Light Company.
As We Size Up the Future—George Boeddener, Managing Director, National Warm Air Heating & Air Conditioning Association.
Pennies or Dollars in Post War Heating—R. H. Warmer, Sales Promotion Manager, Minneapolis Honeywell Regulator Company.
Our National Association—Patrick S. Varden, President of Albany, N. Y., and C. J. Meyer, National Secretary, of Buffalo, N. Y.

Then the usual banquet with floor show and dancing, our hospitality room, door prizes donated by the trade publications, ladies entertainments with prizes—in fact, everything provided to insure educational features and pleasure thrown in.

Paul L. Biersach, Sec'y.

Milwaukee

The newly elected Board of Directors of the Milwaukee Sheet Metal Contractors Association, Inc., met at the Hotel Schroeder on December 5th and elected the following officers for the coming year:

President—A. E. Winkler
1st Vice President—Howard Benning
Secretary—Calvin Droegkamp
Treasurer—Frank Kramer
Executive Secretary—Paul L. Biersach

Owing to the New Year holiday, it was decided to postpone the January meeting until the second Tuesday, January 9th.

Paul L. Biersach, Exec. Sec'y

4 reasons why you can make money *now*

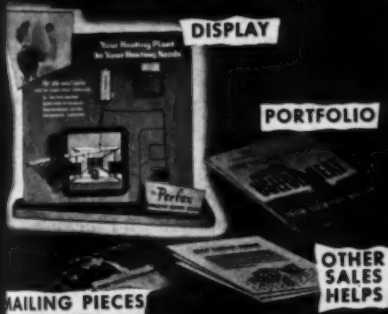
Providing Automatic Heat for Hand-Fired Furnaces by Installing Perfex Combustion Control Systems

1

At the time of the sale, the salesperson can show the prospect the actual operation of the system. This is a powerful selling tool that gives the sales story on fuel savings in colorful, illustrated form to help you make more sales.

2

The display is a powerful selling tool that gives the sales story on fuel savings in colorful, illustrated form to help you make more sales.



3

Powerful Merchandising Kit

You sell Perfex Combustion Control Systems easier because you have this powerful Perfex Merchandising Kit to back you up. This colorful display, wired for actual operation, shows prospects exactly how the system works on their furnaces. In addition, there is material for newspapers, radio and direct mail advertising to prospects. The portfolio is a powerful selling tool that gives the sales story on fuel savings in colorful, illustrated form to help you make more sales.

4



Perfex
CORPORATION

420 W. OKLAHOMA AVE. • MILWAUKEE 7, WISCONSIN

Yes, I want to cash in on fuel savings sales now,
rush me the details.

Name

Address

City.....Zone.....State.....

Association Activities . . .

New York State

The 1945 Convention of the New York State Sheet Metal, Roofing and Air Conditioning Contractors' Association, Inc. is scheduled for March 20 and 21 at the Sheraton Hotel in Rochester. The program is in the making. Two days of useful information for your business is planned by the committee, and the usual spirit of good fellowship will prevail in the "Open House," courtesy "The Merchandiser."

The Group Compensation sponsored by the State association for the benefit of members has completed its third year of operation with another dividend showing a saving of 42.2 per cent. The Group now has 73 members—a gain of 13 during the last year.

The following statement has been given to the members by our Group Managers:

Premium	\$ 91,283.53	
Interest Earnings	357.69	
Total Income	91,641.22	
Loss	\$33,428.00	
Expense including Reinsurance, but excluding management cost	20,758.25	54,186.25
Initial Premium (15% less than Stock and Mutual Rates) is	91,283.53	
Premium at Stock and Mutual Rates	107,392.38	
The following table shows costs and savings:		
Premium at Stock and Mutual Rates	\$107,392.38	
Actual Premium	91,283.53	
Initial Gross Saving	16,108.85	
15% discount		
Earned Interest	357.69	
Total Gross Initial Saving	16,466.54	
Less Management Cost	9,128.35	
Initial Saving	7,338.19	6.8%
Dividend	27,385.06	
Cash Saving	34,723.25	32.3%
Increase in Group Members Surplus	10,600.24	
Total Saving	45,323.49	42.2%

One session of our convention will be given over entirely to a talk on ways and means of increasing the group membership.

Mark these dates on your calendar now, and bring your wife along. The ladies committee in Rochester will show them a very pleasant two days.

Clarence J. Meyer, State Secy.

St. Louis

The Associated Sheet Metal, Air Conditioning and Heating Contractors of St. Louis, Incorporated, is getting busy on plans for the coming National Sheet Metal Association convention which will be held in St. Louis April 29-30, May 1, 1945. We are urging all members to become active and help put the convention over big.

We are asking the members' wives to join the Ladies' Auxiliary to help entertain visiting ladies.

We feel that the Association has accomplished considerable good work during 1944 in that during the latter part we have had two meetings a month, and had a speaker at each second meeting. The other meetings were devoted to the regular business and to a blackboard discussion of the problems that beset all sheet metal shops.

Interesting talks and discussions of the year (as I remember them) were "Heat Loss, Fans, Installation & Insulation" by Fred Axhelm of Front Rank Furnace Company; "Your Business" by L. Rudolf of A. G. Brauer Supply Company. Blackboard discussion and demonstration by President Harry H. Wright on "Baffling of Furnaces." Talk on "Taxes & Inflation" by Joseph Forshaw of Forshaw of St. Louis, Inc.; "Post War Heating" by H. Grossenbacher of Grossenbacher Furnace Co. At another meeting Hammond Sheet Metal Company sponsored the showing of a film entitled "Making of Steel" by Carnegie Illinois Steel Co. Another meeting was given over to Mr. Simons of Minneapolis Honeywell Company, who spoke on "Installation of Electric Damper Controls."

At one meeting there was a blackboard discussion about

the cost and selling price of 8 and 9 inch smoke pipe, elbows, bands and thimbles.

In September the Association through a committee composed of Clarence Franke, W. L. Dulle, and E. B. Langenberg, were successful in helping to formulate a new revised City Heating Code helpful to the industry.

All Sheet Metal shops in the St. Louis Area are invited to join and help in this fine work as well as benefit by it. If interested contact Wallace Cavallo, Secretary, 4351 Osceola St., St. Louis 16.

Philadelphia

The current officers of the Association of Roofing; Metal & Heating Engineers of Philadelphia are

President—William Bork
Vice President—E. T. Rice
Treasurer—Richard Guenther
Secretary—R. H. Readinger, 2714 Woodleigh Road, Oakmont, Upper Darby, Pa.

Cook County, Illinois

The Sheet Metal Contractors Association of Cook County, Illinois, held their annual meeting at the Atlantic Hotel, Chicago, on the evening of December 14th.

All of the present officers were re-elected for 1945 as follows:

President—Wm. J. Perkinson, Perkinson & Brown.
Vice-President—Richard Robinson, American 3-way Luxfer.
Sec'y—Jerry Meyers, Meyers Brothers.
Treas.—Albert J. Wagner, Jr., Albert J. Wagner & Son.

A report was made summarizing the work of the association for the year 1944. Also an outline of things to be accomplished in 1945. The personnel of all committees will remain unchanged.

Wm. J. Perkinson, Pres.

Florida

The Florida Roofer for December, published by The Roofing & Sheet Metal Contractors Association of Florida, carried a "Merry Christmas" to members and quoted from a letter received from J. Victor King of Sanford, North Carolina, a director of the Carolina Roofing and Sheet metal Contractors Association and of the Sheet Metal Contractors' National Association, Inc., urging the Florida association or any members to join the National group:

"The dues are 1/10 of 1 per cent of productive payroll for the year ending May 30. However, you pay on a pro-rata basis, which would cut this amount in half if you join up now. You might tell your officers that your association will have a director on the National Board, whose expenses will be paid to three annual meetings. Such a policy gives a local or state association full voice and part in the National Association. It would be better for your association to join, but any number can join."

L. A. Burgess, Sec'y,
915 North Dixie Highway,
West Palm Beach.

Oil Heat Institute—Rochester, N. Y.

The Rochester, N. Y., chapter of the Oil Heat Institute met at the Sheraton Hotel recently with W. A. Matheson, president of the Williams Oil-O-Matic Heating Corporation as principle speaker. Ray H. Adams, president of the Rochester chapter presided, and Carroll P. Miller, secretary, gave a report on the recent regional Institute meeting in New York City.

A. E. Hess, executive director of Oil Heat Institute of America, outlined the new program being pushed by the Institute, which includes appointment of a technical secretary, a good representative in Washington to meet gas competition, increased scientific research with special regard to new oils, adaptation of present equipment to new oils, getting new men in industry through trade schools to provide basic training with dealers, revision of Handbook of Oil Burning with incorporation of standardized installation rules and a general system of management and cost accounting for dealers.

CENTURY

Is Going To Stay In There
Pitching... 'Til The War
Is Won!!



In

- Past Performance
- Present Production
- Future Planning

CENTURY Is The Consistent Leader!

Without detriment to our present war production for the armed forces, Century Engineers are working for the day of Victory.

They are embodying the results of new research and scientific advancements in a line of heating equipment, worthy of Century's reputation for efficient comfort in modern oil heating equipment.

Tomorrow may be near or far—but when it comes you may count upon Century's Leadership in superior heating equipment to meet the exacting demands of tomorrow's market.

*In the Meantime —
Keep Buying War Bonds!*



CENTURY ENGINEERING CORP.

CEDAR RAPIDS, IOWA

OIL BURNERS
HUMIDIFIERS

BOILER-BURNER UNITS
WATER HEATERS

WARM AIR FURNACES
AIR CONDITIONING

Trimtherm

**TOMORROW'S
THERMOSTATS**

Today!

- **T-80 SERIES**
Trimtherm Thermostats are designed for all-gas control systems.
- **ACCURATE REMOTE CONTROL**
of desired room temperatures.
- **SURFACE MOUNTING**
with flush, streamlined appearance; no recess in wall.
- **1/2° DIFFERENTIAL**
Without false heat input.
- **MODERN DESIGN**
Harmonizes with room appointments.
- **PLASTIC BASE**
Thermally isolates thermostat from wall.
- **VISIBLE MARKINGS**
All calibrations easily read.
- **ADJUSTMENT ON COVER**
No wall smear.



**AVAILABLE
IN PACKAGE
SETS**

● **T-80 SERIES THERMOSTATS** are also available in Package Sets, together with B-60 gas control with tamper-proof cover and integral pilot valve assembly; 30 feet of wire; and thermocouple pilot generator. *Everything needed*, in a convenient package, for quiet, safe, automatic control of central and floor furnaces, boilers, radiators, gas ranges and water heaters.

WRITE FOR CATALOG 52

GENERAL CONTROLS
801 ALLEN AVENUE
BRANCHES: Atlanta, Boston, Philadelphia, San Francisco,
Denver, Chicago, Kansas City, New York, Cleveland, Detroit, Dallas
Distributors in Principal Cities

GLENDALE 1, CALIF.

Association Activities . . .

Blower Manufacturers

Coincident with the National Warm Air Heating and Air Conditioning Association meeting in Cleveland the Furnace Blower Manufacturers Association held its meeting at the Statler Hotel, Cleveland, on Tuesday, December 12th.

Among the items of current interest that were discussed at the meeting were—priority regulations applying to blowers, civilian requirements releases on blowers and blower parts, the problems of manpower, fractional horsepower motors and other critical materials applying to blowers.

The proposed publicity program of the National Warm Air Heating and Air Conditioning Association was discussed at length and was highly endorsed by all of the members.

On the technical side, the subject of two-speed blowers, continuous blower operation, special controls and other items were discussed and it was agreed that the discussions should be continued at a blower manufacturers clinic to be held in Urbana in the near future. The following officers were elected for 1945.

Marion I. Levy, President
E. P. Edelman, Vice President
Fred Bishop, Secretary and Treasurer

MARION I. LEVY, President
5601 Walworth Ave., Cleveland 2.

Electrical League Conference

The first electrical industry conference on controlled indoor climate was held recently in the Hotel Statler, Cleveland, Ohio, by the Electrical League of Cleveland. The meeting was attended by more than 300 members and guests.

In October the Electrical League of Cleveland appointed an Indoor Climate Committee to develop a promotional program.

George Boeddener, Managing Director, National Warm Air Heating and Air Conditioning Association was the first speaker on the program. His talk dealt with a program for training installation men, contractors and dealers. He said, "Action must supplement planning right now, if this industry is to get its share of the consumers' dollar."

Mr. Boeddener was followed by C. T. Burg, General Sales Manager, Iron Fireman Manufacturing Company and member of the I. C. I. Board of Directors.

C. E. Lewis, President, Oil Heat Institute of America and member of the Advisory Council to the Board of I.C.I., was the third speaker.

W. R. Moore, Regional Manager, Minneapolis-Honeywell Regulator Company, was the speaker before dinner. He pointed out that the turnover in heating dealers is 38 per cent. "This," he reasoned, "shows a definite need for training." In outlining the market opportunities for controlled indoor climate in the Cleveland area Mr. Moore explained that of the 220,000 homes 205,000 had central heating systems but that only 40,000 of them had automatic firing installations.

P. B. Zimmerman, President, Indoor Climate Institute and Vice President and General Sales Manager, Chrysler Corporation, Airtemp Division, was the after dinner speaker at the Electrical League of Cleveland's conference. His subject was "Making Cooperation Count."

Jack North, President of the Electrical League of Cleveland and General Sales Manager, Cleveland Electric Illuminating Company, presided over the industry conference. W. T. Clark, Managing Director of the League, introduced the speakers.

Among other Indoor Climate Institute personalities present were A. E. Schanuel, Executive Secretary and W. L. Seelbach of Forest City Foundries Company, member of the I.C.I. Board of Directors.

The PERFECT ACCESSORY

to the Product-Education Program of the National Warm Air Heating and Air Conditioning Association

10 POCKET-SIZE VOLUMES

by Kenneth Lawyer, M.A., M.Ed.

Associate Professor of Marketing, Western Reserve University, and lecturer on training and business topics at University of Illinois and the University of Pittsburgh.

Formerly Sales Manager, Weinstock-Lubin & Co.—Branch Store Manager, Roos Bros., Inc.—Director of Personnel Training (TWI) for the Rola Co., Marquette Metal Products Co., Marshall Field & Co., Carson, Pirie, Scott Co., and other prominent concerns. Consultant on Distributive Education, U. S. Office of Education; Consultant for U. S. Army Vocational Training, Camp Grant, Illinois; Staff Member, Personnel Institute.

Mr. Lawyer is also author of "Store-wide Sales Training" and "Going Into Business For Yourself," and a contributor to leading educational and trade publications.

- Vol. 1 Selling ... A Profession
- Vol. 2 The Business of Selling
- Vol. 3 The Services of Selling
- Vol. 4 Determining the Need
- Vol. 5 The Superior Product
- Vol. 6 The Meeting of Minds
- Vol. 7 Follow-up for the Future
- Vol. 8 Facts About the Product
- Vol. 9 The Appliance Salesman's Opportunity
- Vol. 10 The Attributes of Leadership

Schedule of Prices

PRE-PUBLICATION	
No. of Sets	Per Set
1	\$4.00
2 to 10	3.50
11 to 25	3.25
26 or more	3.00
AFTER APRIL 1, 1945	
No. of Sets	Per Set
1	\$5.00
2 to 10	4.00
11 to 25	3.75
26 or more	3.50

AIR CONTROLS, INC.

Division of
THE CLEVELAND HEATER CO.
2310 Superior Ave., Cleveland 14, O.
PIONEER PROPELLER FAN and
FURNACE BLOWER MFRS.

The "Service of Selling" Series of Practical Sales Training Texts NON-TECHNICAL - - EASY TO READ AND REMEMBER

This series of ten books is an accessory to the National Product-Educational Program of the National Warm Air Heating and Air Conditioning Association.

Every business man at V-day will be facing new and difficult problems. New products, new methods, new ways of selling will be the aftermath of the war. Perhaps the greatest of these problems facing us is the problem of sales management and sales training. And it will be for that reason that executives are going to pay more attention to the principles and practices of salesmanship. In other words "Sales Training" is going to be first on their list.

This is no time for mistakes, fumbling or delays. Post War sales problems will be different from today's. Your practical experience will mean nothing. The time to prepare for post war is now. The salesman who wants to fit himself for the opportunities ahead will want to know:

- how to make the best of his time,
- how to avoid unprofitable canvassing.
- how to increase sales,
- the reason why the prospect did not purchase, and, if his fault,
- how to prevent such mistakes in the future.

These books reflect the broad experience of the author and Air Controls, Inc., manufacturers of Rex Blowers and Rex Airate Propeller Fans, in training home appliance salesmen. In addition, the author has taken full cognizance of the many war-born innovations in teaching technique. The result is a balanced blend of time-proven methods and adaptations of war-inspired, streamlined training procedures like those evolved by "Training Within Industry" to boost war goods production. This material was prepared and

is offered you as an aid in solving the serious training problems that will confront most sales organizations in the impending readjustment period.

If you are interested in your future as a salesman or sales executive, do not fail to add "Service of Selling" to your business tool-kit. Due to paper shortage only a limited edition can be printed—available April 1, 1945. Reserve enough sets for your tentative training needs and save money besides, by sending in your pre-publication order without delay.

PRE-PUBLICATION ORDER BLANK

Air Controls, Inc.,
2310 Superior Ave.,
Cleveland 14, Ohio

Date

Reserve for us.....Sets of the "Service of Selling" series.

Check enclosed Bill when shipped.....

Name

Company

Address

CityZone No. State.....

Sampsel

AUTOMATIC CONTROLS

BUILDS FOR LONG LIFE

New engineering developments give greater accuracy.

Ruggedly constructed for long life—carefree service.

Adequate air-flow through case for quick response.

Protective plastic case does not affect action of blade.

Large, easy-to-read dial for quick accurate setting.

Sampsel design bi-metal blade gives close temperature control.

Extremely sensitive response to temperature change.

QUALITY ALWAYS

Sampsel Controls give more for less money. They're engineered and built by Sampsel with emphasis on quality. That's why Sampsel Controls are easier to sell. Distributors and dealers make better profit—and build customer enthusiasm. Sell dependable controls — Sampsel Controls.



PACKAGE UNITS for *Zutcher Sales*



No. 8873 Cool Saving Unit Damper Motor with built in Transformer, Warm Air Limit Control, Thermostat and all accessories for complete installation.

No. 8878 Cool Saving Unit Same as 8873, but without Warm Air Limit Control. Send for complete story on Sampsel Package Units.

SAMPEL TIME CONTROL, INC.

SPRING VALLEY, ILLINOIS

Association Activities . . .

OPA Appoints Stoker Advisory Committee

The Office of Price Administration recently announced the formation of the Stoker Manufacturers Industry Advisory Committee. The personnel of this committee is the same as the WPB Stoker Manufacturers Advisory Committee, as follows:

R. C. Goddard, Steel Products Engineering Co., Springfield, Ohio.
L. W. Grove, Jr., Frederick Iron & Steel Co., Frederick, Maryland.
B. M. Guthrie, Kingston Production Corporation, Kokomo, Indiana.
R. W. McFadden, The Will-Burt Company, Orville, Ohio.
C. A. Potts, U. S. Machine Corporation, Lebanon, Indiana.
E. C. Sammons, Iron Fireman Mfg. Company, Portland, Oregon.
H. E. Still, Muncie Gear Works, Muncie, Indiana.
J. H. Simpson, Hershey Machine & Foundry Co., Manheim, Pennsylvania.
Walter Sormane, Conco Corporation, Mendota, Illinois.
K. C. Ellsworth, Link-Belt Company, Chicago.
J. M. McClintock, Illinois Iron & Bolt Co., Chicago.

Meetings with OPA will pertain only to stoker prices and conditions in the industry involving price ceilings and production costs.

Meetings with WPB will pertain to production, manpower and priority problems in connection with both Class A and Class B stokers.

In both cases, the committee serves only in an advisory and consulting capacity. Government agencies make and announce any decisions which may be reached.

The whole problem of reconversion is being discussed pro and con in the newspapers, over the air and at conferences and meetings of leading and influential business groups as well as by Government officials. As the war in Europe grows in intensity and time, it is evident that the "wraps" will be placed more and more on additional civilian production. Undoubtedly this great question will be the background of the discussions between stoker manufacturers serving on the two above advisory committees and Government agencies.

Marc G. Bluth, Exec. Sec'y.

CONVENTIONS AND MEETINGS

1945

Feb. 5-6—Sheet Metal Contractors Association of Wisconsin. 31st Annual. Hotel Schroeder. Paul L. Biersach, Sec'y., 225 E. Michigan, Milwaukee.
Feb. 12-13—Sheet Metal and Warm Air Heating Contractors' Association of Indiana, Inc., Indianapolis. Homer Selch, Secretary, 946 Hosbrook, Indianapolis 3, Indiana.
Mar. 7-9—Michigan Sheet Metal, Roofing, Heating & Air Conditioning Contractors' Association. Durant Hotel, Flint. Annual. N. J. Biddle, Secretary, Detroit 2, Michigan.
Mar. 20-21—New York State Sheet Metal, Roofing and Air Conditioning Contractors' Association, Inc. Annual. Sheraton Hotel, Rochester. Clarence J. Meyer, Sec'y., 567 Genesee St., Buffalo 4.
Jan. 22-24—American Society of Heating & Ventilating Engineers. Annual. Hotel Statler, Boston, Mass.
April 29-May 2—Sheet Metal Contractors' National Association, Inc. Annual. Melbourne Hotel, St. Louis. Clarence J. Meyer, National Secretary, Buffalo 4, N. Y.

Correction Please

THE Rectangular Reversible Transition article appearing in the June issue will bear the following corrections: Line 2 in paragraph 1 should read 50 inches instead of 50 feet. Line 7 in paragraph 8 should read: true length of line 2-7 in plan, instead of 2-1 in plan. In the diagram the true lengths measurements do not coincide with those in the plan and elevation due to an error in tracing for the finished copy. However, the method of obtaining the true lengths and applying them, in making the pattern remain unchanged.—Charles McGraw.



Coming Soon!

ANOTHER BIG

DUST-STOP*

PROMOTION PROGRAM

Bigger Profits!

Extra Business!

New Customers!

Whether you are looking for a source of *extra revenue* or only some means of leveling off the peaks and valleys in your service business, you'll be interested in the new DUST-STOP Promotion Program. It's a *money-maker*, anyway you use it.

Dust-Stops, in themselves, are an easy-to-sell and highly profitable item. And because forced-warm-air furnaces are often operated for summer cooling as well as winter heating, you can sell them



the year around. Better yet, you can use them as an entering wedge to get regular service business in your "off" months.

So, prepare to "Clean up with Dust-Stops" this spring... and during the summer as well! Ask your Dust-Stop Distributor about the new FREE selling helps, or write Owens-Corning Fiberglas Corporation, 1930 Nicholas Building, Toledo 1, Ohio. In Canada, Fiberglas Canada Limited, Oshawa, Ontario.

DUSTSTOP

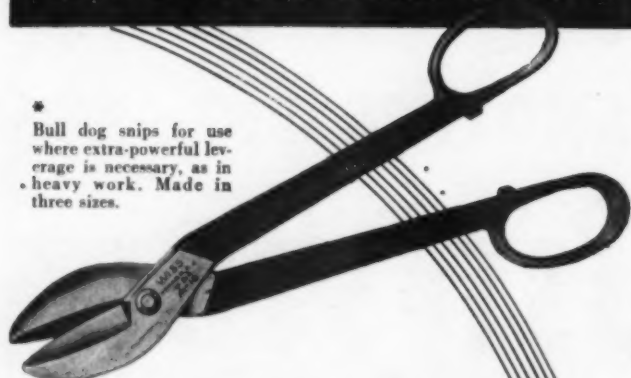
PT. M. REG. U.S. PAT. OFF.

AIR FILTERS

—a FIBERGLAS product

A BETTER TOOL for a BETTER JOB

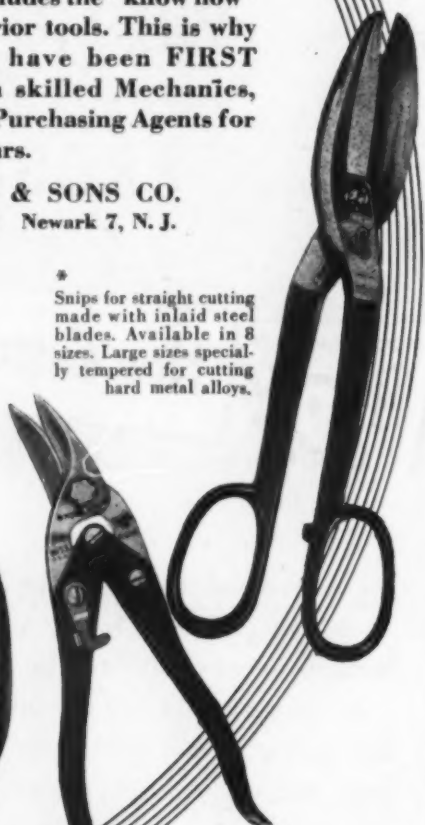
* Bull dog snips for use where extra-powerful leverage is necessary, as in heavy work. Made in three sizes.



The "know how" to turn out a good job usually includes the "know how" to select superior tools. This is why **WISS Snips** have been **FIRST CHOICE** with skilled Mechanics, Foremen and Purchasing Agents for nearly 100 years.

J. WISS & SONS CO.
Est. 1848 Newark 7, N. J.

* Snips for straight cutting made with inlaid steel blades. Available in 8 sizes. Large sizes specially tempered for cutting hard metal alloys.



* Combination snips for cutting curved or straight lines. Popular as a many purpose cutter. Made in four sizes. All specially tempered for cutting hard alloys.



Compound lever aviation snips for all kinds of intricate metal cutting.

WISS
TINNERS' Snips
*Certain Sizes Are Discontinued for the Duration

NWAH&AC Ass'n Convention

(Continued from page 186)

Mention should be made of the many additional activities which contributed to the enjoyable and valuable program. In reporting the activities of the membership committee, Frank Mehrings announced that there has been established a Canadian Chapter of the association with some fifteen manufacturer members in the group. These Canadian members have attended several committee meetings during the past year and turned out in good force at the December convention.


Entertainment

The Cleveland Entertainment Committee extended to the convention a banquet and cocktail party, with some very good entertainment. This Cleveland Entertainment Committee consists of: Marion I. Levy, Viking Air Conditioning Corporation, Chairman; I. E. Seith, Forest City Foundries Co., Chairman; and the following members: Cy Burg, Iron Fireman Manufacturing Co.; H. E. Curtis, Auer Register Company; Don Fisher, Home Heating Co.; E. P. Hayes, C. A. Olsen Manufacturing Co.; R. A. Jack, American Artisan; Ben Krause, Air Controls, Inc.; Hunter Morrison, Morrison Products, Inc.; A. H. Rybolt, Rybolt Heater Co.; Harold Sharp, Sharp Heating Supply Co.; Atley Wise, Wise Furnace Co.; Wilson Wright, Republic Steel Corporation.

Committee Activity

Photographs which accompany this report show some of the active Committees in their sessions. Mention has already been made of the proposed research suggested by the Research Advisory Committee.

The Codes Committee under the chairmanship of W. D. Redrup has sponsored a new Code and Manual for the design and installation of Warm Air Winter Air Conditioning Systems and the Ordinance Form of Code which accompanies the manual; this committee is also intensively interested in insuring the success of the National Advertising Campaign by making certain that the dealers who will sell this equipment will be able to engineer and install the systems to satisfy the expectations of the home owner who buys on the strength of the National Advertising campaign. Chairman Redrup believes that an organization should be set up whereby there will be made available to warm air heating dealers in every locality in the country a school for the instruction of the dealer in the proper method of using the two new codes and manuals. This gigantic task can be accomplished, says Mr. Redrup, if each manufacturer will send one of his engineers to the Code and Manual Clinic to be held in Urbana, and if this engineer on his return to his firm will become the nucleus for more instructors to teach more schools in more and more localities. Only as the dealer is able and will install according to the Codes and Manual, points out Chairman Redrup, can the industry honestly pursue the National Advertising Campaign, which undoubtedly will convince the home owner that in warm air heating he can obtain true indoor comfort.



it's impossible!

time was when it was considered impossible to spot weld heavy gauges with a balanced three-phase load . . .

"THREE-PHASE" WELDING

now provides the answer!

Both manufacturers and power companies have long torn their hair over the problem of spot welding heavy gauges. Conventional AC single phase welders cause serious disturbance to the usual three-phase power supply, operate at low power factor because of the heavy reactive load, and demand high power due to the high secondary resistance.

In announcing the "THREE-PHASE", Sciaky presents a method of resistance welding heavy gauges which effectively solves these problems. By employing an ingenious system of rectification and reconversion, Sciaky welders now *operate on a balanced Three Phase load at near unity power factor (use less KVA)*.

Watch for subsequent announcements explaining the operation of the "THREE-PHASE."

SCI AKY BROS.

Manufacturers of a Complete Line of AC and DC Electric Resistance
Welding Machines

4915 West 67th Street Chicago 38, Illinois

Offices in Detroit, Los Angeles, Washington and Cleveland
Representatives in Principal Cities

In England: Sciaky Electric Welding Machines, Ltd., London

In France: Sciaky S.A., 13, 15 Rue Charles Fournier, Paris

To

MASTER
TEMPERATURE CONTROLS

Customers

As we say "Good Bye" to 1944, our chief regret is that we have not been able to supply all your needs. But let's regard the difference between your needs and our deliveries as a mutual contribution towards the winning of the war.

As we try to forget the problems and worries of the past year, we are cheered by the splendid recognition by many customers of our earnest efforts to serve them as well as the most trying conditions would permit.

We look forward with confidence and hope to happier days. Without detracting from our war effort, we have planned for post-war progress . . . worked out improvements in our products and devised new precision instruments. The "Master" mark on future temperature controls will stand for greater comfort and longer service. We are looking forward to the day when we may invite you to share this fuller future with us.



WHITE MANUFACTURING CO.

2368 University Ave. - St. Paul, Minn.

Amendments, Interpretations

(Continued from page 107)

Oil for Used Stoves

FUEL OIL rations will be available in the East Coast and Middle West areas to eligible consumers who have space heating oil stoves that they acquired second-hand after the stove rationing program went into effect, OPA announces. This provision will allow rations to those who bought *used* space heaters after August 23, 1943.

Heretofore, fuel oil rations for use in space heaters acquired after August 23, 1943, have been granted only to persons who could establish their need for a *new* space heater under the stove rationing regulations. This denied rations to most consumers who acquired non-rationed—that is, second-hand—space heaters.

(Amendment 35 to Revised Ration Order 11—Fuel Oil, effective November 28, 1944.)

Hardship Oil Change

A REVISED procedure for issuing fuel oil "hardship" rations to consumers in the East Coast and Middle West areas provides extra oil for consumers who have taken all reasonable measures to conserve oil but still need more for heat and hot water in order to avoid undue hardship.

The principal change made is that after an application is approved, local War Price and Rationing boards will issue a hardship ration sufficient to meet the consumer's needs for the balance of the heating season, rather than just a ration sufficient to tide him over until his next regular coupons become good.

Rationing experience has shown that some of these people have extra needs that are not temporary but will continue throughout the heating season. Since the total of their extra requirements can be figured fairly accurately, using a method based on consideration of the amount of oil and coupons on hand and the percentage of the heating season that has elapsed, a single hardship ration for the total extra need can be issued at one time, thus removing the necessity for additional trips to the board.

(Amendment 34 to Revised Ration Order 11—Fuel Oil, effective December 2, 1944.)

Army-Navy Termination Regulation

THE COMPLETED Joint Army-Navy Termination Regulation now supersedes the War Department's Procurement Regulation No. 15 and all Navy Directives on contract termination issued in the past.

In a statement outlining the purpose and scope of this new bible for settling fixed-price contracts, the War and Navy Departments announced:

"The Joint Termination Regulation now issued by the War and Navy Departments seeks to provide uniform and workable tools for carrying out the three-fold purpose of the Contract Settlement Act of 1944: to settle termination claims fairly and quickly; to clear termination inventory from war plants promptly, and to provide adequate interim financing. In large

★ *When you buy hand tools ask for* ★

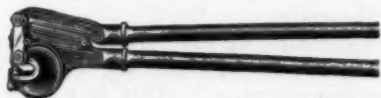


W. A. WHITNEY



No. 1 Punch

Capacity $\frac{3}{8}$ " hole through $\frac{1}{4}$ " iron
Length 34". Wt. 23 lbs. Depth of throat $1\frac{1}{8}$ ".
Punches and dies $\frac{1}{8}$ " to $\frac{9}{16}$ " by $\frac{1}{64}$ "



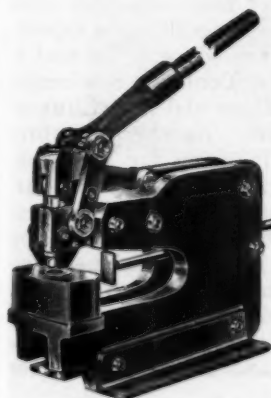
No. 2 Punch

Capacity $\frac{5}{16}$ " hole through $\frac{1}{4}$ " iron
Length 23". Wt. 14 lbs. Depth of throat $1\frac{11}{16}$ ".
Punches and dies $\frac{3}{32}$ " to $\frac{1}{2}$ " by $\frac{1}{64}$ "



Channel Iron Punch

(A companion to No. 2 Punch)
Capacity $\frac{1}{4}$ " hole through $\frac{1}{4}$ " iron
Length 23". Wt. 17 lbs. Depth of throat $1\frac{1}{8}$ ".
Punches and dies $\frac{3}{32}$ " to $\frac{1}{2}$ " by $\frac{1}{64}$ "



No. 92 Bench Punch

(Uses No. 91 punches and dies)
Weight 165 lbs. Depth of throat 10"

HERE'S WHY—

There's a Whitney tool for *every* job, and *every* tool has these 6 Important Features—

- *Simple Design*
- *Sturdy construction for hardest kind of service*
- *Well distributed weight, making tool easy to handle*
- *Drop forgings of high grade alloy steel on all main parts*
- *Heat treated wearing parts*
- *Guarantee against defect in material and workmanship*

Extra punches and dies are of A-1 grade tool steel, expertly heat treated and tempered

The Registered Trade Mark



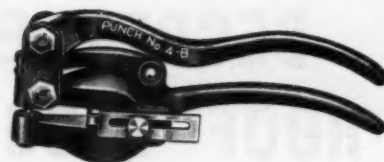
which appears on all W. A. Whitney tools and extra punches and dies is the manufacturer's promise that they will give entire satisfaction and the utmost in service.

Illustrated are a few Whitney Hand Lever Punches. Write for our catalog giving full information on all sizes and styles, or ask your jobber.

Buy W. A. Whitney tools from your jobber



WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.



No. 4-B Tinner's Punch

Capacity $\frac{1}{4}$ " hole through 16 gauge iron
Length $8\frac{1}{2}$ ". Wt. 3 lbs. Depth of throat 2"
Punches and dies $\frac{1}{16}$ " to $\frac{9}{32}$ " by $\frac{1}{64}$ "



No. 6

Skylight, Ventilating and Tank Flange Punch (Especially adapted for button punching)

Capacity $\frac{1}{4}$ " hole through $\frac{3}{16}$ " iron
Length $26\frac{1}{2}$ ". Wt. $10\frac{1}{2}$ lbs. Depth of throat $1\frac{1}{4}$ "

Punches and dies $\frac{1}{8}$ " to $\frac{9}{32}$ " by $\frac{1}{32}$ "



No. 8-B Punch

Capacity $\frac{1}{4}$ " hole through $\frac{1}{8}$ " iron
Length $18\frac{1}{2}$ ". Wt. $7\frac{1}{2}$ lbs. Depth of throat 2"

Punches and dies $\frac{1}{16}$ " to $\frac{7}{16}$ " by $\frac{1}{64}$ "



No. 91 Bench Punch

Capacity $\frac{1}{2}$ " hole through $\frac{1}{4}$ " iron
 $\frac{3}{4}$ " hole through $\frac{3}{16}$ " iron
2" hole through $\frac{1}{8}$ " iron
Weight 82 lbs. Depth of throat 5"
Punches and dies $\frac{1}{8}$ " to 2"

Channel Iron

$2\frac{1}{2}$ " Flange x $\frac{1}{4}$ " Web
Angle Iron
 $2\frac{1}{2}$ x $2\frac{1}{2}$ x $\frac{1}{4}$ "

RE-DISCOVERY OF ANCIENT PLASTIC SECRET ENDS ROOF TROUBLES!

**ELATERITE ROOFING MODERNIZES
OLD FORMULA FOR PROTECTION
AGAINST WEATHER**

Ancient Egyptians and Babylonians had a secret formula which modern plastic chemists have rediscovered . . . you will find the time and weather-defying elements which have preserved Egyptian and Babylonian monuments through the centuries in Elaterite, the lasting chemical combination which is the ideal covering either for new roofs or for renewing old roofs.

Elaterite is plastic and workable; it does not dry out, become brittle, crack or break. Elaterite will not run or "alligator" on the steepest, hottest roof. Once applied on a roof Elaterite requires no further attention or renewal. Elaterite contains no tar, no adulterants of any kind. Elaterite is quickly and easily applied cold. Saves time and labor because it can be easily applied even by unskilled help.

Write for a sample of Elaterite, the age-old plastic secret brought up to date, today!

ELATERITE PLASTIC PRODUCTS

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Canton 2, Ohio

measure, the Regulation provides guides, recommendations, and mechanical aids for reaching speedy and equitable settlements, and includes necessary safeguards to protect the Government's interest."

Perhaps the most important change to previous procedures now included in the Joint Termination Regulation is the additional authority delegated to higher tier contractors with respect to their subcontractors. Contractors can now make final settlement with subcontractors of net claims under \$1,000 where the latter keeps or disposes of all termination inventory.

Also under the new Regulation the important problem of plant clearance has been made easier by a provision which allows the prime contractor to approve the disposal of termination inventory of a subcontractor whose claim is under \$10,000 without further government review. This action may now be taken regardless of whether the higher tier contractor is authorized to settle the claim.

In an effort toward speeding up the inevitable drawn out dickering connected with termination, the JTR sets up "pretermination planning." This is a provision for the getting together of contractor and government representatives in order to reach certain agreements before the actual termination of a contract is at hand. During this pretermination meeting, contractors and government representatives will be able to clear up such items as: proper overhead charges to be made against the terminated portion of a contract, unit cost of a contractor's inventory at various stages of manufacture, the manner in which this inventory would be disposed of and the price which should apply if it is retained by the contractor or sold by him.

Another important step taken by the new JTR toward streamlining contract settlement has been in setting up a "Consolidated Termination Program." This is a plan under which contractors are selected and assigned to particular services of the Army or offices of the Navy rather than duplicating effort by involving two or more procurement offices.

With regard to Interim Financing, the Joint Termination Regulation now outlines the method by which guaranteed termination loans (V, VT and T) may be obtained through a contractor's commercial bank. Information is also provided for obtaining partial payments from the government of at least 75, and up to 95 per cent, of a contractor's estimated costs.

Also included in the JTR are new uniform settlement proposal forms applicable to all procurement agencies. These forms have been greatly simplified, now making it possible to file practically any type of settlement proposal on one standard form with accompanying schedules. The new forms, plus renovated cost accounting instructions, make up the latest joint accounting manual.

The new JTR has been issued simultaneously with three additional publications covering different aspects of termination and settlement procedure. The first is a pamphlet covering "Standard Contract Settlement Proposal Forms" with instructions and an outline of a hypothetical termination case. Another is a brochure entitled "Termination Financing for War Contractors" explaining the procedure for obtaining partial payments or guaranteed loans. The final publication is "Navy Material Inspection Service Manual on Contract Termination." The latter is designed primarily for Navy personnel but can be obtained by Navy contractors. This manual defines the operations of the Navy inspector who functions as field representative of the contracting officer and is local contact for the Navy contractor.

Here's a **STRONG MONEY-MAKER** for Your New Peacetime Jobs

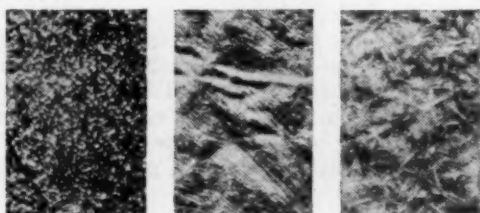


One of these days you'll be doing a lot of work that requires *immediate* painting. Here ARMCO Galvanized PAINTGRIP sheets can help you make money and keep your customers satisfied.

This *original* Bonderized Galvanized sheet requires no acid etching treatment. The phosphate film insulates the paint from the zinc and holds paint several times longer than an acid-etched galvanized surface. Photomicrographs tell the story.

The "Scratch" Test

This test shows how paint adheres to PAINTGRIP. The top of the sample is Bonderized. When scratched with a pen knife only a superficial mark is noticeable. Paint on ordinary galvanized (bottom half) comes off readily.

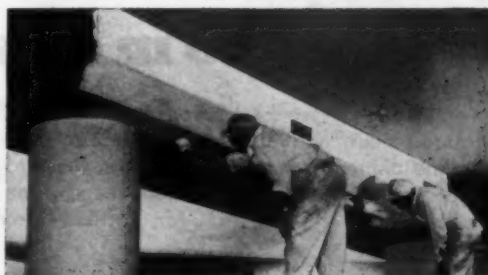


A

B

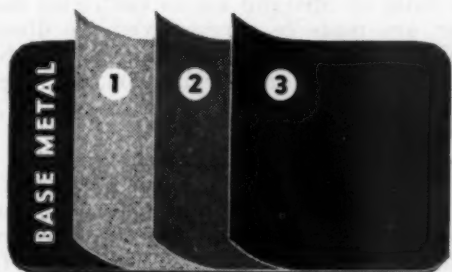
C

- A This magnification indicates that an ordinary galvanized steel appears slick and difficult to "coat" with paint.
- B Ordinary galvanized after acid etching. The etching has removed part of the protective zinc coating.
- C Compare the mat-like paint-holding surface of ARMCO PAINTGRIP with that of the others. No coating has been removed and paint is insulated from the zinc.



Immediate Painting

ARMCO PAINTGRIP can be painted immediately. No costly acid etching or primers are needed. Thus the full weight of the protective zinc coating is preserved intact.



What Paintgrip Is....

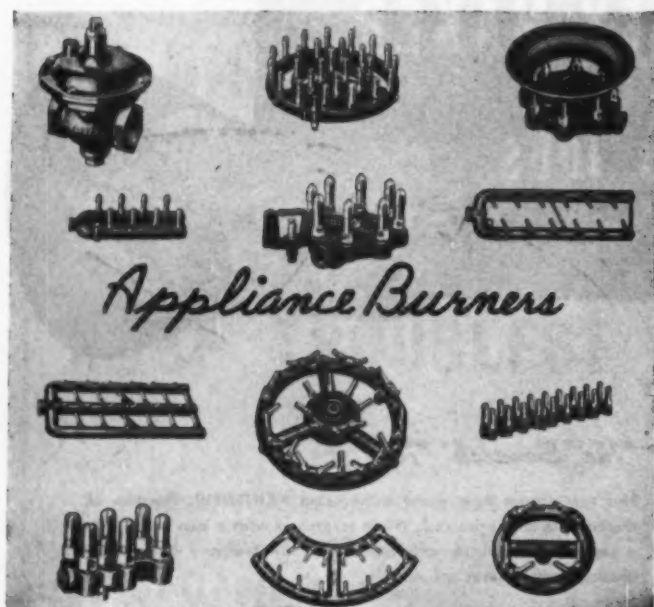
- 1. A full zinc coating under—
- 2. ARMCO PAINTGRIP: A mill-applied Bonderized finish that insulates zinc from—
- 3. Paint or enamel that can be applied in any color.

It might be a good idea to line up some of these PAINTGRIP jobs now. Then get in touch with the Armco Distributor and ask him to put a tentative hold-order on what you'll need. The American Rolling Mill Co., 81 Curtis St., Middletown, Ohio.



The American Rolling Mill Company

BARBER



A Report to Our Customers



Under severe restrictions on gas heating equipment, and also under the urge of war-time demands on nearly all plants, Barber has, of course, for the past three years, done its full share of war work, on critical aircraft parts.

The entire gas appliance industry is keenly aware of the necessity for planning for post-war business. The industry will expand because of wider application for gas appliances, greater areas of gas service, and wider use of manufactured and liquid gases. Furthermore, after three years of unavoidable restraints, there is a tremendous backlog in the market for replacements and repairs.

We anticipate an early resumption of greater service to our own civilian customers. Improvements in our line of products, evolved during this war production period, will certainly enhance their efficiency.

If you are interested in new business or new uses for appliance burners, conversion burners, and pressure regulators, let Barber engineers plan with you NOW on your specific requirements.

We are gas burner specialists, and offer you our engineering and plant facilities for the development and manufacture of burner units for your specific purposes. Write for Catalog illustrating and listing many types of Burners for Appliances, Gas Conversion Burners for Furnaces and Boilers, Regulators, etc.

THE BARBER GAS BURNER CO.

3704 Superior Ave., Cleveland, Ohio

BARBER *Automatic* JET GAS BURNERS

This latest Joint Termination Regulation is being sent to war contractors throughout the nation. From time to time the publication will be supplemented by revisions needed to bring it up to date.

Requests for copies from recognized war contractors, or banks, lawyers, accountants and accredited professional engineers directly involved in contract termination settlement will be honored. Requests should be addressed to the Joint Termination Regulation Distribution Office, 6th Floor, 90 Church Street, New York 7, N. Y.

On Our Industry's Front

(Continued from page 126)

in advance, particularly since motors are now on the sub-subcontractor scale, WPB officials pointed out.

The proposal of WPB's General Industrial Equipment Division that all companies normally engaged in manufacturing commercial-type alternating current motors be the first to be cut back in special motors used by the armed forces was endorsed by the labor committee. This policy would allow increased production of AC motors by all manufacturers, resulting in a reduction of the present heavy backlog, it was explained. The industry would also be in a better position to supply the requirements for appliance production when their manufacture is again permitted, WPB officials indicated.

Unfilled orders for commercial-type AC motors amount to 10.3 months at current production level, officials of the General Industrial Equipment Division reported. All requirements for military-type motors are being met at present despite the over-all motor backlog of 8.6 months at current production levels.

Excess Material Sales

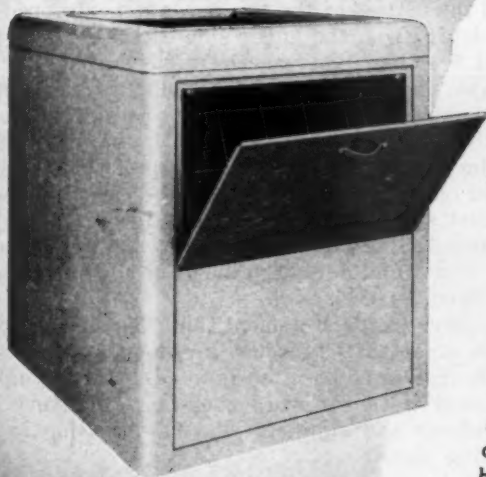
THE War Production Board's policy on special sales of idle and excess controlled materials on an excess allotment authorization has been amended—under the new rules, sales of idle and excess controlled materials under Priorities Regulation No. 13 *will not be authorized* on an excess allotment basis if the proposed use of materials or products would interfere with war production or labor supply needed for war production.

Most sales of idle and excess controlled materials, however, are made to persons who are directly engaged in war production for the Army, Navy or United States Maritime Commission, or in essential civilian production, and labor checks will not have to be made in such cases.

When idle and excess materials are sold for use under the spot authorization rules contained in Priorities Regulation No. 25 (see this issue), labor checks will be made in connection with the spot procedure and will not be required for authorization of special sales.

Special sales are those made by a person holding material in a form different from that in which he usually sells it.

Under the amendment, idle and excess stocks of copper and copper base alloy may be sold to any warehouse. Formerly, specific WPB authorization was required for sales of such stocks of copper and copper base alloy to warehouses.

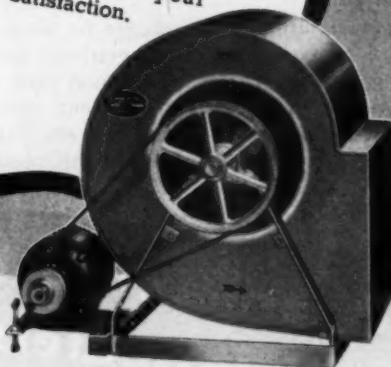
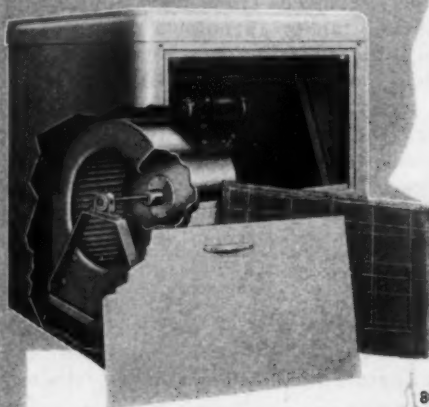


Brundage

BLOWER - FILTER PACKAGE UNITS

With more than a quarter century of blower engineering back of each Brundage Blower why not give your customers greater indoor comfort, both winter or summer, by installing Brundage equipment? Whether you need a complete blower-filter package unit or an assembly, the same master craftsman-dynamically balanced, Brundage duo-multi-blade wheels assure smoother blower performance. Correctly engineered scroll housings plus a sturdy iron chassis are other engineering skills contributing to year 'round Brundage Blower satisfaction.

Brundage Blower Assemblies are the heart of the forced air equipment. The pressure developed assures air circulation even where long piping resistance must be overcome.



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Brundage
COMPANY

BLOWER SPECIALISTS
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LETTERS

from OUR READERS

American Artisan:

Here's some comment on

"How's and Why's of Return Air"

(April, 1944):

1. I agree wholeheartedly with his basic idea that, for the average job, complicated engineering is not necessary and simplified rules *may* be sufficiently accurate.

For the heating contractor, engineering expense is an important factor entering into selling cost. Since the heating contractor is in business primarily to make a profit, it's altogether proper that he should carefully scrutinize every cost item. He must use judgment based on common sense and experience to determine which jobs require elaborate engineering and which can be satisfactorily handled by the application of simplified rules.

But the simplified rules should be basically correct. Mr. Scott proposes a most ingenious method of determining how deep to make panned joist spaces. His rule would probably be an excellent one to use for return air duct sizes not included in the Standard Code Application Manual. But, for duct diameters ranging

from 10 inches to 24 inches, page 11 of the Standard Code Application Manual indicates the minimum depth of panned joists.

Comparing the example which Mr. Scott gives (a 24-in. return), he shows that when two joist spaces are used the bottom of the pan needs to be dropped so that the depth from the under side of the floor to the pan is 21.3 inches, whereas the table on page 11 of the Manual shows that an 18-inch duct is sufficient.

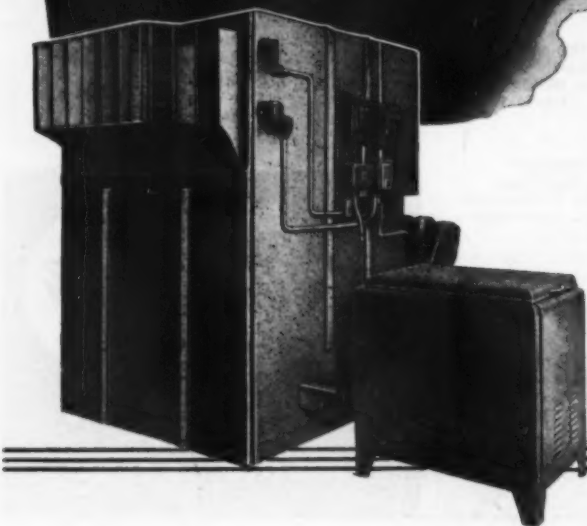
For three joist spaces Mr. Scott shows a required depth of 15 inches whereas the Manual lists 12 inches.

The entire Standard Code Application Manual is based on a careful analysis of the carrying capacities of duct systems for gravity heating as made by Professors A. P. Kratz and S. Konzo and published in the University of Illinois Engineering Experiment Station Circular Series No. 45.

2. Mr. Scott's statement that "No air can enter any room except as equivalent air flows out" is so manifestly true—and so often ignored—that it ought to be repeated word for word every day by every heating contractor and engineer who has occasion to lay out heating plans.

We hear heating men say that they don't put a return air face in a kitchen because it will spread cooking odors through the house, but unless kitchen air is positively removed from the building by a kitchen ventilating fan or through a vent flue or in some other way, the omission of a return air face in the kitchen does not prevent the escape of cooking odors. When one cubic foot of air comes into the kitchen through the warm air register an equivalent volume of room air *must* get out of the room somewhere, somehow. This is not an argument in favor of taking return air from the kitchen—necessarily. But the fact remains that *unless* room air can get out of

**Airtherm Direct-Fired
Unit Heaters**
Give You Warm Air Heat
Only Where and When
You Want It!



You operate the Directtherm Unit only those hours when you need heat—absolutely no waste of fuel due to stand-by loss. There is no danger of freeze-up when the unit is turned off over night.

The Directtherm Heater has a minimum number of parts, high efficiency on the combustion chamber, comparatively low outlet temperature, and a horizontal high velocity air stream with adjustable wide angle of warm air delivery. Can be adjusted to give you heat only where you want it, when you want it.

The Directtherm Heater is scientifically built in 6 standard sizes with capacities from 300,000 to 1,500,000 BTU's.

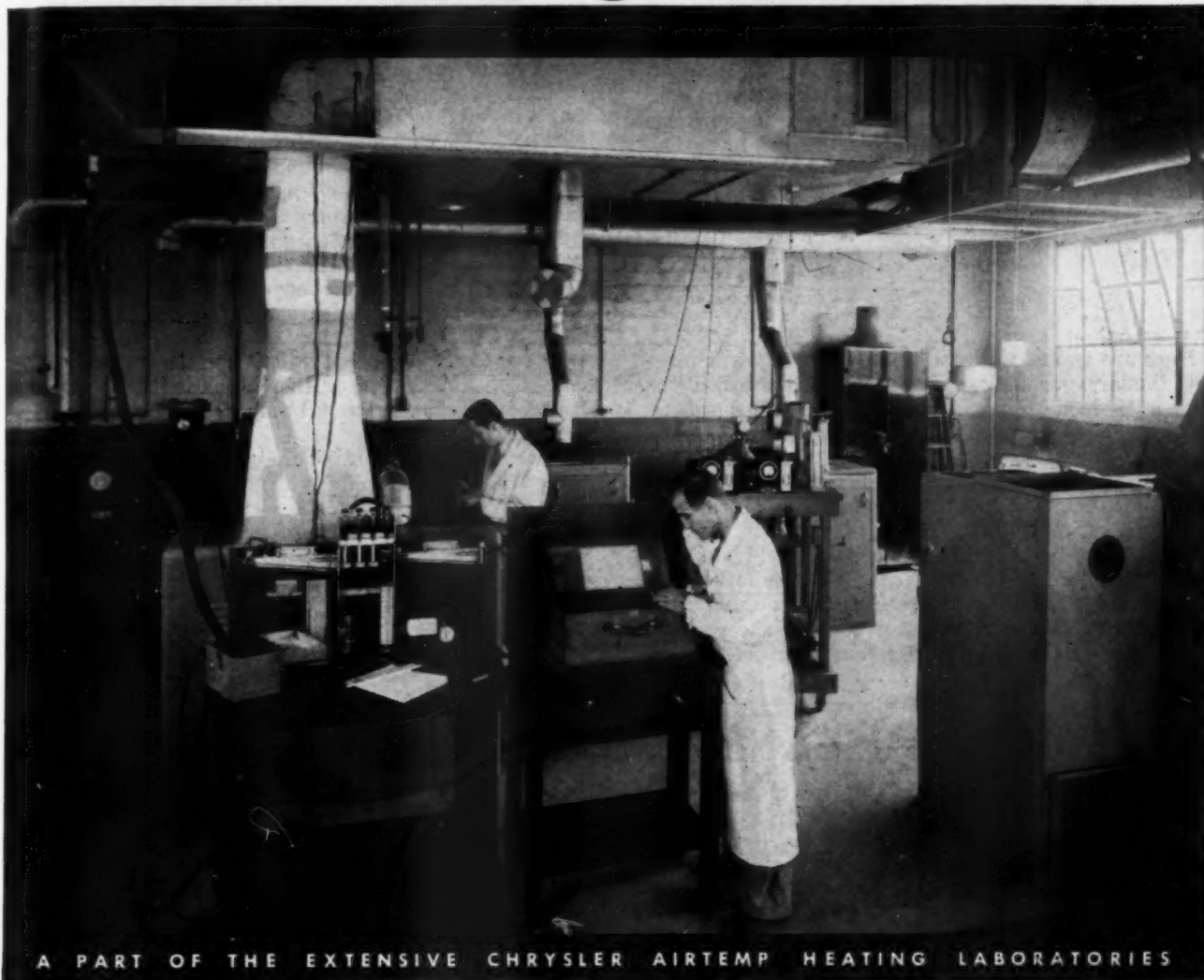
Write today for bulletin giving complete details and specifications on this versatile, efficient heating unit.

AIRTHERM
MANUFACTURING CO.

706 S. Spring Avenue

St. Louis 10, Missouri

CHRYSLER AIRTEMP



A PART OF THE EXTENSIVE CHRYSLER AIRTEMP HEATING LABORATORIES

Years Ahead in Development

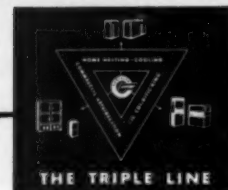
Success starts with the product. That's why the Chrysler Airtemp laboratories are constantly working years ahead. New, compact designs incorporating new principles of combustion will distinguish Chrysler Airtemp postwar heating units—burning all types of fuels.

Equally important improvements and performance features will be found in "Packaged" cooling and commercial refrigeration equipment. Heating dealers, therefore, can anticipate Chrysler Airtemp products with many superior

features to capture sales and profits.

The Chrysler Airtemp Triple Line . . . Heating, Cooling and Commercial Refrigeration . . . offers heating dealers an opportunity for 12 months profitable operation. Direct dealer contracts will be available for just the Chrysler Airtemp heating line—or for heating in combination with air conditioning or commercial refrigeration—or for all three lines of products. • Airtemp Division of Chrysler Corporation, Dayton 1, Ohio. • In Canada, Therm-O-Rite Products, Limited, Toronto, Ontario.

Buy More War Bonds! Tune in Major Bowes every Thursday, CBS, 9 p. m., E. W. T.



THE 4 FUNDAMENTALS of CHRYSLER AIRTEMP DEALER OPERATIONS

1. Customer Planning
2. Proper Display
3. Outside Selling
4. Customer Service



HEATING • COOLING • REFRIGERATION

the kitchen and out of the house (a) by exfiltration through window and door cracks, (b) through a vent flue, (c) through a kitchen ventilating fan, or (d) through an open window, it will either have to be allowed to flow through a kitchen return air face into the return air system or else it will find its way out of the kitchen through a door or doors leading to other rooms.

In this connection it is interesting to note that the new Application Manual for Forced Air Heating issued by the National Warm Air Heating & Air Conditioning Association, indicates that one of the items in plant design is a fresh air intake for ventilation. One purpose of such a fresh air intake is to provide make up air to replace that which is definitely taken out of the building for such ventilation purposes.

G. A. Voorhees
Hall-Neal Furnace Co.,
Indianapolis

American Artisan:

Here are two of the conditions which exist at present: the largest installer of furnaces in the world who sells a 19 inch firepot furnace, Victory furnace, by the way, with basement cold air, using the customer's old pipeless register at a price of \$375, does the Victory furnace cost the branch more than \$50, the smoke pipe about \$3, and the installation \$10 or \$15, or a total of, let us say, \$68?

Last Thursday I called on a Mrs. Sullivan, who asked me to check her furnace. All I could see her furnace needed was a furnace cleaning job, but Mrs. Sullivan was not quite satisfied because she was expecting me to tell her that her four year old furnace needed re-cementing.

So a high pressure sales organization salesman takes out the water pan from the four year old furnace and pulls out a piece of excess furnace cement and proves to Mrs. Sullivan that her furnace is in very much need of re-cementing.

Now Mrs. Sullivan remembers very well that several years ago the same company took down her furnace to be re-cemented and when the company learned that a new furnace could not be sold they refused to set the furnace up again and Mrs. Sullivan was forced to hire someone else to do this work. But still Mrs. Sullivan was somewhat receptive to have this same old trick happen all over again. This business is going on all the time around here.

And another thing—we have a furnace dealer who installs blower air systems by taking the supply of cold air from the basement. About a week ago a consumer placed an order for a furnace from this cellar air dealer and when I asked why he had selected this dealer the owner could give me only one reason—the Chamber of Commerce said that this dealer was all right and recommended him. I am convinced this consumer did not place the order with that dealer because of a low price but only because the dealer is said to be reliable.

I want to know what business the Chamber of Commerce has recommending a dealer to be reliable when they don't know the facts?

The thing that I am most concerned about is how can I stop competitors from ruining the warm air heating industry. Now that it is on the upgrade let us do everything in our power to keep it there.

Sincerely yours,

DEVINO COMPANY,
Waterbury, Conn.

ROCK ISLAND REGISTER COMPANY

2435 Fifth Avenue

Manufacturers of

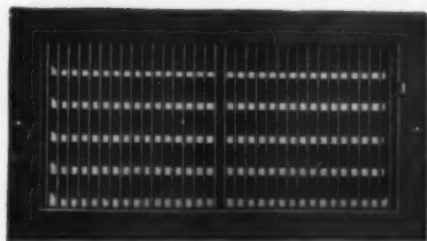
Rock Island, Ill.

AIR-VANE and BENDA-VANE Air Conditioning

Registers, Intakes and Grilles

AIR-VANE REGISTERS

Air Vane Registers constructed with vertical or horizontal Vanes for right or left or downward Deflection of Air flow. Multi-louvre dampers for closing and 15 degree downward directional air flow standard. Also available with single louvre in Wall and Baseboard registers. Grilles and Intakes in all standard Warm Air pipe sizes. Large and Special sizes furnished promptly.



No. 802 Air-Vane Forced Air Register

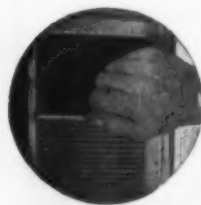


Out-O-Wall Register

NO-STREAK and OUT-O-WALL REGISTERS

For Gravity Lines. Available in standard sizes; also in narrow floor projections for second floor stacks; also Forced Air Sizes.

Inset below shows simple adjustment of vanes with special tool furnished.



BENDA-VANE REGISTERS

Benda-Vane Registers are made in Single Valve and Multi-Louvre types. Available in sizes for all standard Forced Air and Gravity Size Registers.

Above, and Floor and Ventilating Registers and Grilles in several designs and styles.

COMPLETE CATALOG INFORMATION ON ALL PRODUCTS FURNISHED ON REQUEST.



No. 200 Series—No-Streak Bar Design. First Floor One Way



Here's Your Directory of Quality Soldering Supplies

SILOY...The New Wonder Soder That Needs No Priority

Buy Thru Your Jobber

You can end your soder worries right now with Allen's Siloy Soder, the new low tin-content wonder soder. It works like magic with most common metals . . . in many cases even better than high tin-content soders. Recent prolonged tests prove an amazingly high strength on joints sodered with Siloy. That's a fact worth remembering. Samples of this outstanding "No Priority" product are yours for the asking.

No Priority
WIRE



(Item 17-20)

OR
BAR

No Priority



At Your
Service



ALLEN Technical Research Division

. . . maintained for the testing, development and perfection of Allen products and to help solve our customers' technical problems. If you have a sodering, tinning or related problem we shall be glad to co-operate. There is no charge for this service.

The following Allen Technical Bulletins are available without charge.

- A) Strength of Soder (Resistance to vibration).
- B) Breaking strength of Wire Soder (Shows tin-lead proportions).
- C) Length of one pound of Wire Soder in various sizes and alloys.
- D) How to Soder Stainless Steel Pipe and Fittings.

FREE OFFER!

MAIL THIS NOW!

L. B. ALLEN CO., INC.
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Send us FREE Allen Technical Bulletins listed above. Check those desired:
A — B — C — D

Without obligation send us further information on the product items checked here: Nos. 1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9 — 10 — 11.

NAME

ADDRESS

Jobber

ALLEN SODERING SALTS

(Item 1-01)

An all around flux in convenient powder form; just add water 3 to 5 times according to metal to be sodered. Soders all metals but aluminum. Takes a quick bite and makes the soder hold on. Nonacid. Comes packed in metal or glass as preferred.



ALLEN "ALL-SOL" STAINLESS STEEL SODERING FLUX

(Item 603)

Here's a remarkable, fast flux that makes the sodering of stainless steel as easy as sodering tin plate. (Also available in a special odorless formula where less strength is required). "ALL-SOL" works with all soders but for best results use Special Soders.



ALLEN SODERING OIL

(Item 4-04)

A highly technical, concentrated sodering compound officially endorsed by the National Underwriters.

Causes neither verdigris nor corrosion. Gets into the tiniest crevice and takes the soder along with it. Makes perfect electrical and mechanical joints. For hand or machine sodering. Excellent for sweat sodering copper pipe joints.



ALLEN Neutral Rosin Fluid Flux

(Item 0-08)

This is a flux of absolute safety for electric motors, telephones, radio, commutators, instrument work, fine wires, etc. This flux is so safe you can spill the flux on the work allowing it to remain forever with no corrosion hazard to the finest wire or metals. Allen Neutral Rosin Fluid Flux is absolutely neutral and moisture free and absolutely non-conductive to electrical current.



ALLEN SODERING ACID

(Item 9-07)
(Formula G. I.)

An active sodering acid for galvanized and hard-to-soder metals; and old metal that has been exposed to the weather. Works well on monel metal (white label shipping regulations).

Note: For "all-around" sodering on new and fairly clean work use Allen Sodering Liquid (see No. 6 above.)

Note: For sensitive electrical sodering see No. 8 directly below.



ALLEN SODERING LIQUID

(Item 8-06)

Standard Formula. For all-a-round work, for all metals save aluminum and stainless steel.

17,000 pounds to the square inch with no gumming, fumes, or corrosion. Double strength, non-evaporating. Works like Lightning. Adaptable to hand, or machine sodering. Excellent for tinning the sodering copper.



ALLEN EZY-FLO Torch Formula Sodering Paste

(Item 2-A)

A special sodering paste for torch and "sweat joint" sodering. Also works well with the sodering iron. Comes in same sizes and at same prices as "Standard Formula."



ALLEN SODERING PASTE

(Item 2-02)

Standard Formula. Safest sodering paste made — fast working—a convenient corrosion-free, soft form of flux. Adheres to the surface while you soder. Assures secure electrical and mechanical joints. Saves time. Triples strength of the soder. Makes soder self-fluxing. Official National Underwriters Laboratory approved listing.



SILVER SODER

WIRE AND RIBBON FORM

(Item 20-15)

Wire form for all around work. Excellent tensile strength, high vibration and corrosion resistance. Gives rigid, good color joint.

Ribbon form same specifications as wire. (For band saw work.)



FLUX FOR SILVER SODER

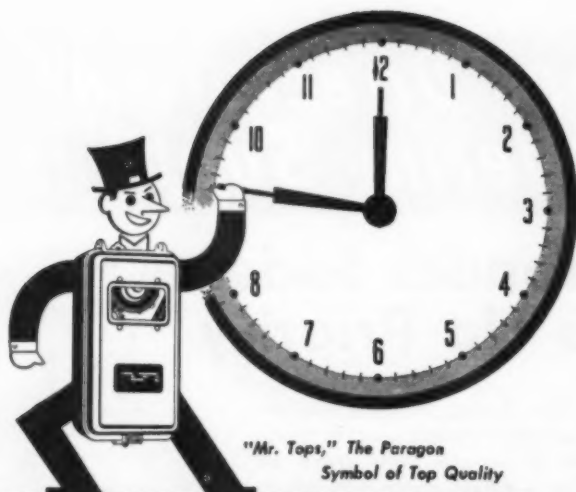
(Item 3)

Provides quick, smooth flow giving deep sound silver soder penetration on most metals including stainless steel.

ALLEN L.B. ALLEN CO. INC. SODERING SUPPLIES



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CHICAGO 31, ILL.



LET "MR. TOPS" CONTROL YOUR TIMING

of AUTOMATIC HEATING, VENTILATING,
LIGHTING, PUMPING OR FLUSHING
OPERATIONS . . .

Paragon 700 Series Time Switches are equipped with 6" calendar dials which make one complete revolution every 7 days. Dial trippers can be independently set for different daily ON and OFF schedules. Settings can be made in advance for an entire week. Any day or days operations may be omitted entirely on a pre-set program.

Each day of week clearly separated from other days; graduated into hours and half hours; day and night distinctly separated. Operations from ON to OFF or from OFF to ON can be set as close as three hours apart and can be separately adjusted throughout each 24 hour day in the week.

Write for a complete bulletin.



Paragon 700
Series Time
Switch

**PARAGON
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Chicago 5, Illinois

Paragon *Chicago*
BUILDERS OF ELECTRICAL EQUIPMENT SINCE 1905

Simplified Pipe and Fittings

(Continued from page 154)

dusty. Adherence to the recommendation will not be mandatory on anyone. The success of the recommendation must rest on the soundness of the principle of this form of waste elimination as applied in this instance, and upon the recognition by producers, distributors, users, and others concerned, of benefits which flow from it. It will constitute a notice to all that here is a practice which, if followed, will result in the most economical production and distribution in the most advantageous use of these pipes and fittings. Its issuance by the Division of Simplified Practice is guarantee that it is approved as such by a substantial majority of the industry and its customers. This then is the first difference. This proposed Simplified Practice Recommendation will be a recommendation as its name implies, whereas the proposals heretofore under consideration were drafted with a view to regulating strictly the variety of pipe and fittings that could be produced.

This proposal also differs from the drafts prepared for the War Production Board in that its purposes are different. The Board was vitally concerned with saving critical material by regulating its use. It will be noted, for example, that this proposal lists double-wall fittings which the Board would have eliminated, because of the extra material required in their construction. This Simplified Practice Program is concerned exclusively with the elimination from demand, through education, of those items which are in but slight demand and which create excessive inventory and production costs, which in turn cancel out some of the economies of mass production.

This proposal, therefore, lists considerably more varieties than the War Production Board proposed to permit. There are about 1,223 items in this proposal, as against 759 items in the list contemplated by the War Production Board.

The catalog of one producer of fittings has heretofore shown a total of 5,580 different sizes and varieties of pipe and fittings for gravity and forced warm air and air conditioning systems. This list omits 78 per cent of those listings. Only the largest producers have carried such extensive lines, but data submitted by other manufacturers showed that the War Production Board's proposal would have cut their inventory on an average of about 40 per cent. By the same token it is estimated that this proposal, if generally adopted, would result in the gradual disappearance of the demand for about 40 to 45 per cent of the varieties carried by the average producer and distributor.

Note

The Annual Warm Air Conference at Michigan State College (East Lansing) will begin on Monday, March 19, at 9 A.M. and continue through Thursday. The course fee is \$5.00. Meals and overnight accommodations will be available at a reasonable cost. If program is effected by "no-meeting ruling" notice will appear.



Profits for You!

More Warmth and Fuel Economy for Your Space Heater Customers

A-P Thermostatic Temperature Controls are
Designed for ALL Oil-Burning Space Heaters Using A-P
Model 240-DR or UR Manual Controls . . .

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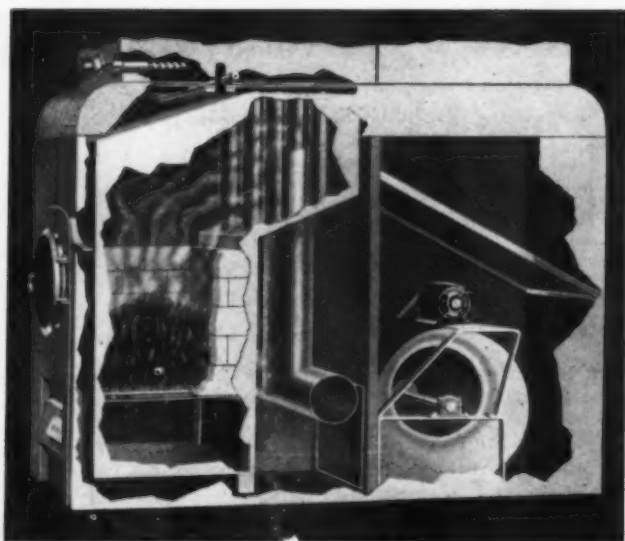
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JACKSON & CHURCH COMPANY
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Hoods, Valves For Wood Working

(Continued from page 168)

Fig. 76 shows a typical two-way angle valve, where the leaf closed to *D* permits a straight drop to *E*. When the valve is turned to *E*, the leaf causes the refuse to slide into the angle branch *D*. The gate valves are operated by pulleys secured to an angle bar or otherwise attached, to enable operating the leaf by the drop cords. Heavy steel bearing plates of $\frac{1}{8}$ to $\frac{3}{16}$ in. thickness are riveted to the shell on front and back, as at *d*, in which the valve rod operates. If this is not done, the metal around valve rod wears out quickly, the valve becomes unbalanced and sticks and dust seeps through such enlargements.

Two- and Three-Way Valves

Double leaf valves, as illustrated in Fig. 77, are used where material is to flow in either or both of the pipes at the same time. Valves of this kind are used on systems handling long stringy materials. A flat bar *G* is bolted to the arm sockets of the frame, and by shifting this, both leaves operate as a single unit as *F-F¹* to *F²-F²*. An angle bar *H* is riveted across the valve low enough to clear the arms *G* and awning pulleys are bolted on to operate the valve gates with drop cords.

Three-way valves are used on some of the larger jobs where refuse is directed from a main supply as a collector to three furnace feeder branches or three bins. In Plate No. 34 on the elevation of the boiler front one three-way valve, as in Fig. 78, can be used instead of the two two-way valves shown below the collector. This three-way valve also has two gates or leaves which can be set to deliver refuse to any one or two pipes as well as to all three.

How to Size Valve

The proportioning of the valves is largely based on observing the following: Hold valve to the width of large supply pipe; hold the valve chamber straight so gates do not bind; allow for ample length of valve leaf; reduce for branch pipes below valve chamber; do not spread prongs much over 30 deg. from the vertical; use $\frac{1}{8}$ to $\frac{3}{16}$ in. bearing plates on front and back of all gate rods; use 20-gauge steel and heavier for valves and provide cleanouts on each prong as shown by drawings.

Dump valves, as shown in Fig. 79, are also used for long stringy shavings and other similar materials. They are often called "positive" valves and are used in place of the type presented in Fig. 77, although either valve may be used in stave mills, barrel and tub factories or for dressed cotton or where stringy products are handled. The front and end elevation, also sketch *M*, indicate that the leaf is made in one piece, forming the bottom and sides. The handle, core and frame are securely riveted to the bottom, or the pressure of refuse will tear the metal. At the top deflecting plates are riveted and securely soldered, which can be made as illustrated by detail *N*. The scheme as at *O* may also be employed to provide against dust seepage. Notice that all valves must be strongly built, well riveted, reinforced, soldered and braced; the leaf should be made especially strong and obstructions for catching refuse inside of the valve avoided.

It's Getting Closer!

So What?

Nobody is going to deny that each day we come closer to victory. Obviously, the business significance of that is "give some thought to getting ready for V-Day." Why? It's important—very important—because all of us in our thinking are profoundly conscious of our obligation to see that employment opportunities exist for the returning veterans.

This is not the job of any single group but the task before every employer, every business executive, large or small. All of us share in the results of our united planning, be they good or bad.

Each mail brings us letters that prove the wide interest of distributors, wholesalers, dealers, in getting their future connections definitely lined up. They desire to be in a position to take the returning veterans and train them, with definite knowledge of what they are going to sell, service or repair.

Toridheet has some interesting suggestions to offer those who are seriously interested in planning their future in the oil heating business and its collateral opportunities today.

Everybody knows that we are 100% in war work, that we have now nothing to sell except replacement equipment, but they also know that Toridheet is in business to *stay*, has always built outstandingly dependable heating equipment and worked cooperatively with its sellers.

And there is a widespread understanding in the trade that because Toridheet equipment is beautifully built, service and maintenance costs are exceptionally low.

Perhaps that is one of the reasons why so many splendid concerns are getting in touch with us about tomorrow—and how to meet it.



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Coal and Gas Furnaces • Water Heaters*

Giesecke— Panel Heating

(Continued from page 136)

ance will be $0.61 + 0.23$ or 0.84 , and the temperature drop will be 0.84×34 or 29 degrees and the mean temperature of the air in the space above the ceiling must be 98 plus 29 or 127 F.

6. Determine the rate at which heat must be delivered from the furnace to the space above the ceiling.

This rate is evidently the sum of the rate at which heat must be delivered to the ceiling (34 Btu. per hr. per sq. ft.) and the rate at which heat escapes upward from the space above the ceiling into the attic. This latter rate depends upon the temperature of the air in the attic and upon the character of the construction above the ceiling air space. If the temperature of the air in the attic is 25 F. and if the construction above the ceiling air space is such that its resistance is 15.38 , heat will flow into the attic at the rate of $(127 - 25) \div 15.38$ or 6.6 Btu. per hr. per sq. ft., or 6.6×300 or $1,980$ Btu. per hr. for the entire ceiling in Fig. 6. The rate at which heat must be delivered from the furnace to the ceiling air space is $14,550$ plus $1,980$ or $16,530$ Btu. per hr. In this example, 88 per cent of the total heat would be delivered to the room and 12 per cent to the attic.

The proportion (12 per cent) of the heat wasted into the attic can be reduced by improving the insulating quality of the construction above the ceiling air space, so that its resistance to the flow of heat through it will be greater than 15.38 .

7. Determine the rate at which air must flow through the ceiling space.

This rate evidently depends upon the cooling which takes place in the ceiling space; if the air is to cool 20 degrees during its passage through the ceiling space, i.e., if the air is to enter the ceiling space at 137 F. and leave at 117 F., the volume of air which must flow through the ceiling space is $16,530 \div 20 \times 0.016$ or $51,700$ cfh. or 860 cfm.

8. Determine the arrangement and the sizes of the ducts.

If the space above the ceiling, through which the warm air flows, is not divided into a series of ducts which guide the warm air over the entire surface of the ceiling, the ceiling will not be heated uniformly and it will not serve well as a single heating panel. These ceiling ducts may be arranged in many different ways, depending upon the locations of the stacks in the wall.

For example, the size of the ducts may be selected so that the depth is about $2\frac{1}{2}$ or 3 inches and the width from 24 to 36 inches. If an arrangement like that shown in Fig. 6 is adopted this example, the ducts being 3 inches deep and 30 inches wide, each duct would convey $860/3$ or 287 cfm. and the velocity in each duct would be $(144 \times 287) \div 90$, or about 500 ft. per min., which seems reasonable.

In practice it is not necessary to make as many calculations as are shown in this article; they are shown here to explain the method so that it may be applied in practice when needed. Many of the values which are calculated may be estimated with sufficient accuracy, and if, after the system has been installed, it is found that some of the estimates were slightly inaccurate, the error can be easily corrected by raising or lowering the temperature at which the air is supplied to the heating panel.



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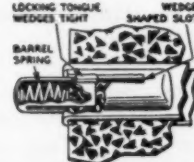
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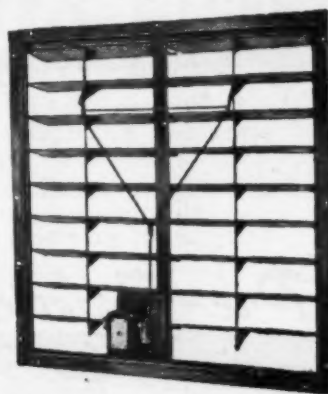
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Effects of Attic Fan on Comfort

(Continued from page 149)

rooms, the volume of air entering a small room may equal that entering a larger room; but, in such a case, the smaller room has a larger number of air changes per hour due to its smaller volume.

A careful check of the temperature data was made to ascertain if the large difference in air changes made an appreciable difference in temperature. It was found that the difference in temperature between rooms never exceeded one degree Fahrenheit.

The air velocities existing at various points in the house are shown in Table 3. With the fan in operation and all windows open, velocities from 18 fpm. to 169 fpm. were produced. A check of Table 3 against Fig. 1 will reveal the fact that most of the lower velocities were at points such as corners, where a rather small degree of air movement would be anticipated. It is important to note that while some locations had velocities much below the average, there was sufficient turbulence in the air flow to produce a reasonable degree of air movement even in corner locations. Table 3 shows also that the higher velocities occurred in rooms having greater number of air changes per hour.

Table 3 shows in addition the increase in air velocity that occurs in certain rooms when the doors and windows of other rooms are closed. It may further be noted that certain combinations of rooms were more effective in increasing air velocity than others.

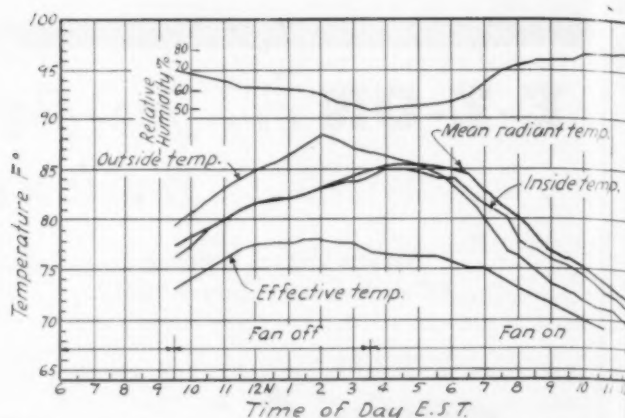


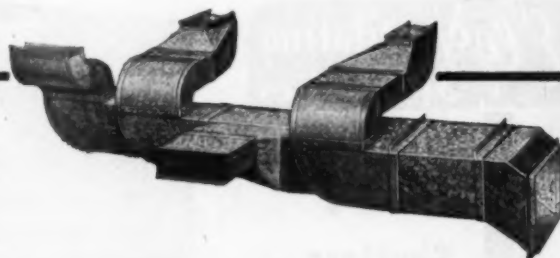
Fig. 3—Curves of time and comfort factors with 45 air changes per hour, 9/11/42.

A few apparently erroneous velocities in Table 3 may be explained by pointing out that the closing of doors in the house places some of the velocity stations in corners, and it also forces the air movement to occur along a somewhat different path.

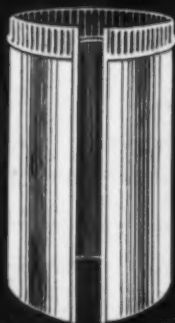
The mean radiant temperatures were computed from the observed data by means of the Bedford-Warner formula. An examination of a large number of readings taken on five different days showed that mean radiant temperature was always very near room air temperature; the difference never exceeded three degrees. During certain periods of time, mean radiant temperature was equal to room air temperature. In the evenings when cool night air was being drawn through the house, mean radiant temperature was only slightly higher than air temperature. A great

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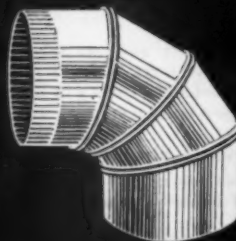


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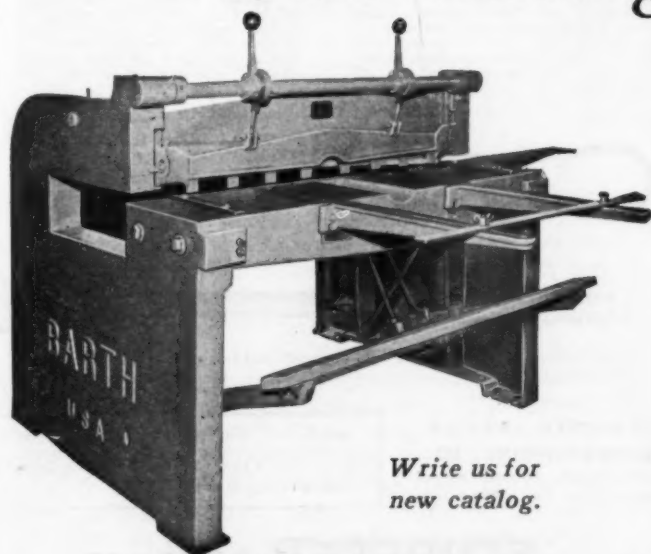
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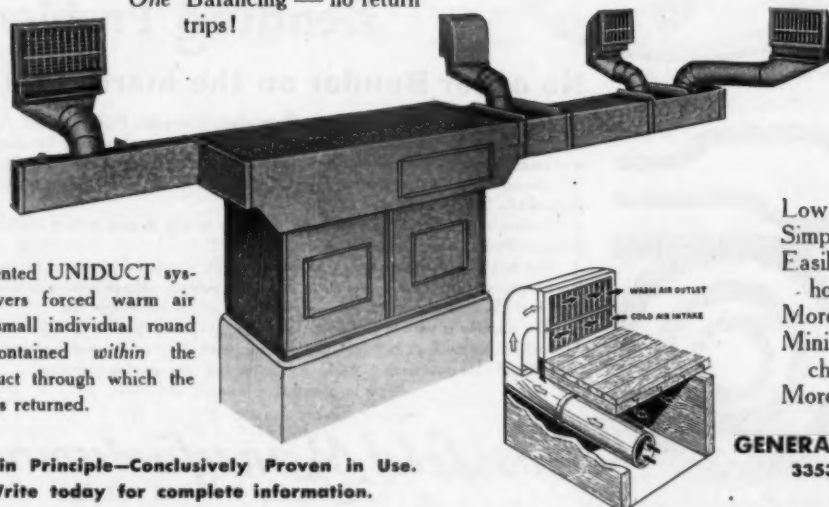
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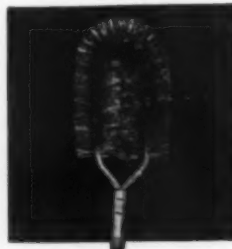
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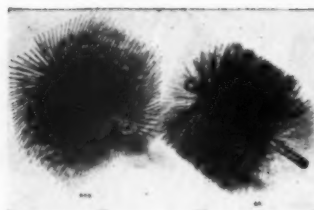
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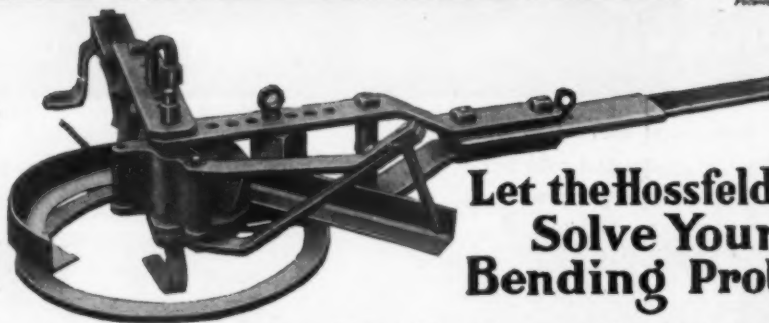
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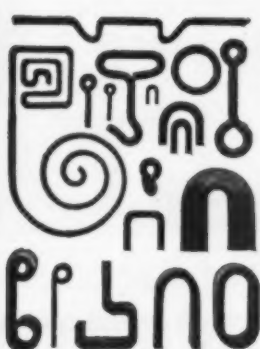
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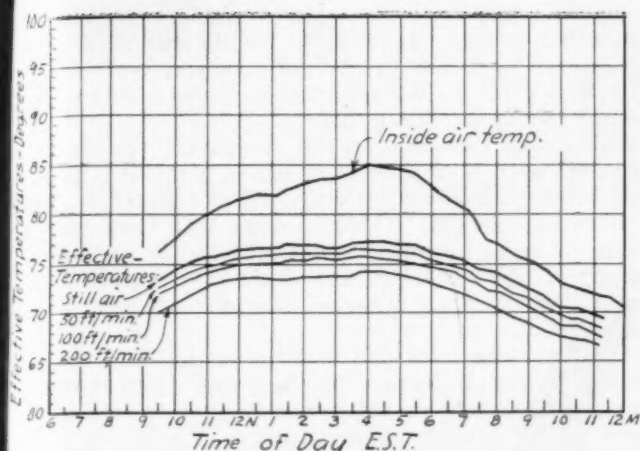


Fig. 4—Curves of time and effective temperatures at various. 9/11/42.

part of the time the difference was not over one degree. The results on mean radiant temperature are presented in the same manner as other temperatures. The curve of Fig. 3 is typical of the values observed.

This curve shows that attic fan operation reduces mean radiant temperature at approximately the same rate as it reduces room air temperature. The curve in Fig. 3 is for Room VI. This room was chosen because it was the southwest corner room and was expected to be affected by solar radiation during the afternoon to a greater extent than some of the other rooms because it was exposed to the sun in the afternoon.

An effective temperature curve for Room VI is shown in Fig. 3. This curve follows the same trend as the inside air temperature curve. It is quite evident that when the fan was turned on the increase in air velocity produced an immediate drop of approximately one degree effective temperature.

An effective temperature of 73 deg. is recommended for summer comfort in the southeast portion of the United States when the dry-bulb temperature ranges from 91 deg. to 95 deg. The effective temperature curve of Fig. 3 shows that this value of 73 deg. was reached at 8:00 p.m. (E.S.T.) at which time the dry-bulb temperature was 78 deg. and that it is reduced still further as the outside temperature decreases. (The values of effective temperature were obtained from a comfort chart.)

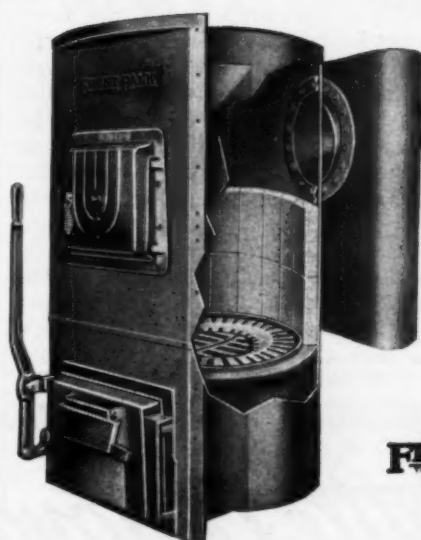
In addition to the effective temperature curve of Fig. 3, the effective temperatures that would have existed in Room VI with various velocities have been plotted in Fig. 4.

Conclusions

The mean radiant temperatures reported here are in agreement with what might be expected. During periods when the fan was off, transfer of heat between surfaces and air would tend to equalize the temperature of air and surfaces. During periods when the fan was on, the mean radiant temperature was only slightly above air temperature. Previous studies of fan night air cooling have shown that in a frame house, surface temperatures are not more than a degree or two above room air. The surface temperatures reported have for the most part been ceiling surfaces, so the average would be less in some cases. Therefore, it would be impossible for mean radiant temperature to exceed air temperature by more than one or

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two degrees in a frame house with this type of cooling.

It is possible that the mean radiant temperatures reported may not be the exact values for the time given, because of the time lag of the globe thermometer. The measurement of mean radiant temperature by the globe thermometer is based on the globe's coming into thermal equilibrium with its environment. In these tests the air temperatures and wall surface temperatures were continuously changing. Therefore, it is unlikely that true thermal equilibria were reached or that the mean radiant temperatures reported are exact. However, it seems reasonable to believe that the values given represent the magnitude and variation in mean radiant temperatures with good accuracy even though they may be slightly displaced as to time.

The results presented give some basis for a discussion of the proper number of air changes per hour. The attic fan used in a given installation should have sufficient capacity to produce the desired comfort conditions as early in the evening as possible.

From the viewpoint of air temperature, not more than 30 or 40 air changes per hour would be economical. Nevertheless, air velocity is a factor in comfort, and the selection of the number of air changes to use must take velocities into account. Fig. 4 shows the effective temperatures that would have existed in Room VI had the air attained the velocities indicated on the curves. When all rooms were open, Room VI had average of velocities of 41 fpm.; thus it can be seen that comfort conditions of 73 deg. ET were reached by 8 p.m. This room had 22 air changes per hour. For the same conditions Room III had 70 air changes per hour, and the velocities averaged 74 fpm., therefore, from Fig. 4 it is seen that Room III would have

reached 73 deg. ET at 7:30 p.m. or 30 min. earlier. Using the same two rooms but selecting maximum rather than average velocities the results are: 73 deg. ET reached by Room VI at 7:45 p.m. and by Room III at 6:45 p.m., or the comfort temperature is reached one hour earlier.

While these data indicate the desirability of high air velocities it is of interest to note a simple method of obtaining higher air velocities without the expense of an extra large fan. Table 3 reveals that when only Rooms IV and VI were open, Room VI had an average velocity of air of 124 fpm. and would have reached 73 deg. ET earlier than either of the previous illustrations.

The foregoing facts and illustrations indicate that while 30 to 40 air changes per hour are sufficient for reducing the inside air temperature to within two degrees of the outside temperature, it is desirable to produce higher air velocities so as to lower the effective temperature. The authors are of the opinion that satisfactory results may be obtained if fans are installed which are capable of producing 40 air changes per hour instead of the generally accepted standard of 60 air changes per hour. (These air changes are based on the total volume of the livable space in the house, and refer to actual air delivered and not to the maximum rated capacity of the fan.) At times when the outside air temperature is unusually high, the greater air velocities desired may be obtained by the simple expedient of closing the rooms which are not occupied.

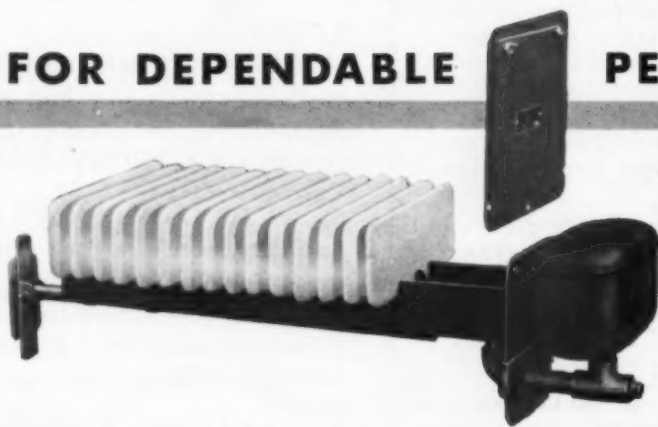
Measurements made at the intake grille show that the fan used in these tests delivered from 70 to 75 per cent of its rated capacity. Larger intake grilles or another type of grille might increase this percentage.

Skuttle Automatic Humidifiers

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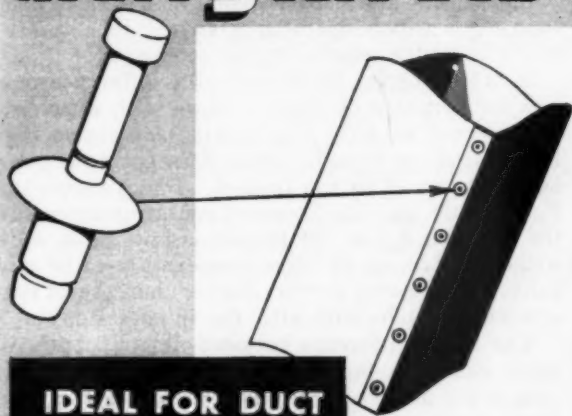
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**IDEAL FOR DUCT
FABRICATION
AND
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Cherry Blind Rivets save time, labor and grief in much sheet metal fabrication—both in the shop and on the job.

They're real rivets—self-plugging and hollow types—yet they are upset from one side of the job only. Cherry Rivets take the place of screws, bolts and other fastening in ducts, stacks, pipes and fittings.

What's more they won't rattle loose in vibration, work out in moving parts or pull apart under strain. Cherry Rivets have exceptional shear and fatigue resistance.

And they are easy to use. They are applied with a simple hand tool on the job or with a power gun in shop production. They require no special skill. Cherry Rivets have wide tolerance, for blind rivets, in hole size and grip length.

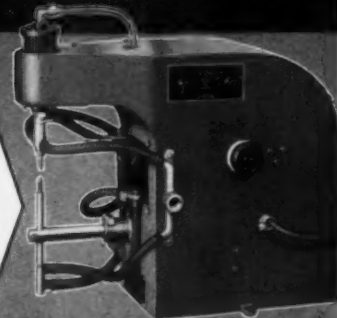
Learn for yourself how Cherry can help out in the tough jobs you're up against. Write for the Cherry Handbook A-43. Address Department A-200, Cherry Rivet Co., 231 Winston St., Los Angeles 13, Calif.

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Precision Type SPOT WELDER
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Now you can join metal surfaces many times faster than ever before with this new-type low cost resistance welder. You may speed production as much as 12 or 15 times, and get cleaner, better joints than ever before. And the exclusive "built-in" timer will let you eliminate completely the human element of error. No more operator fatigue, and now, even "green" help can do high quality work.

LOWEST PRICED AUTOMATIC MACHINE ON THE MARKET

No other air-operated welder is available today at this amazingly low price of \$350 with a built-in Electronic Timer, and solenoid valve controls. The Universal Midget Automatic is the only bench type machine with water-cooled transformer, electrodes and tips.



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AT THESE RESULTS

Compare these results of a simple tear test of a weld made with the Universal Midget Automatic. You will note that the weld nugget held, and only the parent metal gave. Write today and learn how this amazing machine can make money for you.

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Please send full details at no cost on your Midget Automatic Welder and how it can help me.

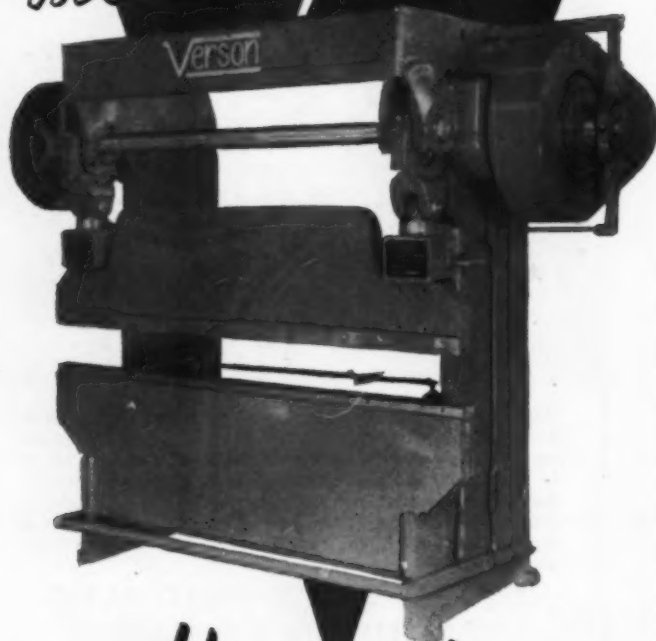
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It is further suggested that means be provided to reduce air movement when comfort has been attained as an examination of Figs. 3 and 4 will show that what might be a pleasant breeze at 9 p.m. may become an objectionable draft by 12 p.m. unless the fan is stopped or its capacity reduced. Although a variable speed motor and thermostatic controls might be used to accomplish this, the most economical means is to use a time clock which operates a switch to stop the fan motor at a time selected by the occupants of the house.

It is interesting to estimate the difference in effective temperature between a house with attic fan and one without an attic fan. Tests have shown that air temperature in a frame house does not decrease much before 8 p.m. if no fan is used. Fig. 3 shows that 84 F. dry-bulb may be assumed for air temperature in the house at 8 p.m. If the air is still, as it would be without a fan, an effective temperature of 80 deg. results; this is seven degrees higher than the 73 deg. ET attained at 8 p.m. with attic fan in operation.

The small difference between air temperature and mean radiant temperature indicates that this difference is not a large factor in determining fan capacity. Since mean radiant temperature will always be near air temperature it is important to observe that if no fan is used mean radiant temperature will be higher than with a fan and will contribute to the discomfort experienced.

The following is the principal conclusion that may be drawn from attic fan data available. The comfort produced depends primarily on only two things for a given house, the conditions of the outside air and the velocity that the fan produces.

Summary of Results

The results of tests on a single story frame house equipped with an attic fan, and located in Atlanta, may be summarized as follows:

1. The inside air was found to be approximately two degrees Fahrenheit above the temperature of the outside air when average number of air changes per hour for the house was 45.
2. With an average for the house of 45 air changes per hour some rooms had as low as 20 air changes per hour while others had in excess of 100.
3. In spite of different rates of air change for various rooms, the air temperature did not vary more than one degree Fahrenheit from one room to another.
4. Large number of air changes are useful only because the increased air velocity decreases effective temperature.
5. The average mean radiant temperature was found to be about one degree above air temperature. The difference never exceeded three degrees.
6. With the fan in operation and all doors and windows open, air velocities varied from 18 to 169 fpm. The lower values were obtained in corners.
7. When some of the rooms were closed the velocity of air at points in other rooms showed a marked increase. Increases of 100 per cent were noted in many cases and 200 per cent in a few locations.
8. With the fan in operation during the evening effective temperature decreased at approximately the same rate as outside dry-bulb air temperature.

Konzo-New

W. A. C. Manual

(Continued from page 131)

existing furnace test codes. The same procedure was used to estimate temperature drops in ducts. In the past, the designer had to estimate temperature drops

for each run of pipe. We have done this once and for all for all lengths of pipes and all sizes. Furthermore, the data used in figuring the temperature drops were obtained from extensive laboratory tests that took into account such variables as air velocity, duct size, emissivity coefficient, and other factors that are much too complicated to consider in ordinary calculations.

In order to make a long story short, you will have to take our word for it at this stage that:

- 1) The New Code and Manual does incorporate all the latest and most reliable test data.
- 2) It is practical and simple.
- 3) It will simplify the training of new men coming into the industry.
- 4) It will reduce the manufacturer's cost, by eliminating odd sizes of equipment.
- 5) It will give uniformly better heating installations.

Closet Shelf Furnaces

(Continued from page 145)

principle depends on investigations now under way by manufacturers.

So we end this summary with this: midget sized heaters up to now have been applied to special airplane requirements; headlines leading the public to think that from airplanes to houses is just a simple step are completely misleading and very premature; if and when this product is ready for the market we will be advised long before sale; meanwhile, this type of unit is only a novelty so far as house heating is concerned.



THERMO-DRIP HUMIDIFIERS

can be relied on to keep moist vapors properly balanced with room temperature because they're

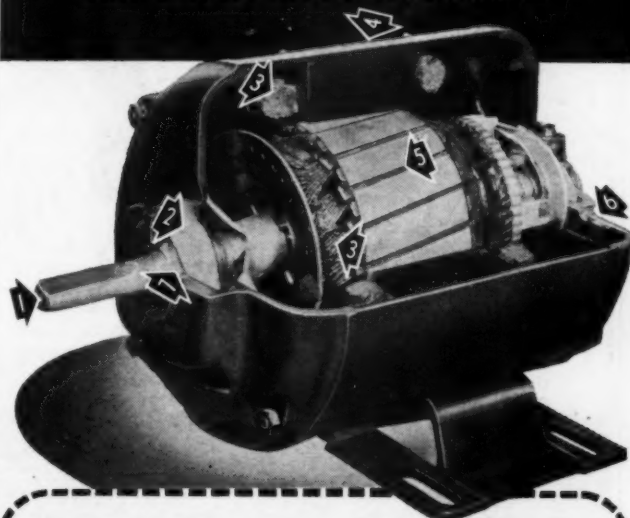
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- 1 **SHAFT** is designed to carry mechanical overloads without appreciable deflection or vibration.
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- 5 **SLOTS** in rotor are skewed to reduce magnetic noise, and to eliminate variation in starting-torque at different positions of the rotor.
- 6 **ENDPLATES** are concentrically machined and closely fit accurately machined frames, assuring perfect centering of shaft and uniform airgap.
- 7 **BEARINGS** are steel-backed for strength and babbitt-lined to minimize wear. They are diamond bored after assembly in endplates and have a mirror-like finish.

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ELECTRICAL AND AUTOMOTIVE PRODUCTS



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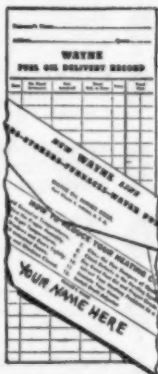
Throatless shears that cut any shape . . . straight, circular or irregular. **FASTER—Precision—accuracy!** Order No. 1 for 14 gauge. No. 2 for 10 gauge. No. 3 for 3/16 inch mild steel and 10 gauge stainless.

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As illustrated—especially designed as a container for fuel oil ration coupons. Front has place for customer's name and ruled form for keeping a complete record of fuel oil purchases. Reverse side lists 12 points on how to save fuel and has place for dealer imprint.



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They're **FREE** to all Oil Burner and Fuel Oil Dealers. Order your supply of these manuals now. State number needed using your business letterhead.

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WAYNE'S V-DAY LINE **WILL BE COMPLETE**

Prospects For 1945

(Continued from page 106)

on a minimum poundage of sheets in 1945. For special contracts; for high priority work, demand and use a high rating—make your civilian usage and repair sheets go as far as possible.

Manpower

Since the beginning of 1944 the shortage of manpower has been a greater hardship on members of this industry than has the shortage of materials and equipment. Had we had floods of furnaces, sheets and other equipment, we couldn't have used them because we just don't have the men to take care of the work. The critical labor shortage situation which was so evident in American Artisan's survey of Manpower in the January, 1944 issue has grown more acute with each passing month.

There can be no improvement in this situation. The setback on the Western Front has already raised the draft call and will keep future calls at a high level until the war is won. If you are struggling along on a hit-or-miss basis hoping men will come back to you, better plan now for intelligent operation on a reduced manpower basis. And while you are thinking about manpower, better also lay plans for the possibility of losing some of the deferred men you now have.

New Housing

According to National Housing Agency the Federal Public Housing Authority will enter 1945 with 95 per cent of its war housing construction completed and the Federal Housing Authority is said to be

IT SAWS! IT FILES!



A PORTABLE
POWER-SAW
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New

MULTI-PURPOSE TOOL
SAVES TIME — SAVES MONEY

★ The Saw-Chief attaches to electric and air drills, or may be driven by flexible shaft. Hack-saw blade in holder reciprocates rapidly with a 7/8" stroke. Cuts all metals—every gauge, wood, plastics, other materials. Eliminates slow, tiresome hand-sawing operations. Reaches into hard-to-get-at places with ease. Insert ordinary machine file for power-filing operations. It's portable . . . carry it from job to job.

QUICK DELIVERIES ON AA-S PRIORITY OR BETTER

The Saw-Chief can be shipped quickly, ready for attaching to your drill or flexible shaft at only \$45.00. May also be obtained complete with heavy duty drill at \$90.00, or with high-powered, lightweight drill at \$83.00.

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SAW-CHIEFS are guaranteed to give complete satisfaction. Your money refunded if the SAW-CHIEF does not save hours of labor on countless operations.

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nearing completion, barring unforeseen requirements. Demands for stepped up production are bringing demands for needed housing, but so far as possible these needs will be met with "temporary" housing units.

NHA Administrator Blandford has said—"the pattern was laid in 1944 for the building of homes of approximately pre-war standards. And as a result of the present availability of various building materials and equipment, any permanent construction which can be permitted will be better than that of a year ago. We had hoped for a considerable volume early in 1945 of housing designed to relieve general congestion and built without occupancy restrictions. These two programs will be carried on to the extent that supplies of material and manpower permit. NHA's preliminary findings on post war needs show that construction of 12,600,000 new dwellings will be necessary in the first ten years after the war to meet the requirements of American families."

In the light of this report it seems we are over the hill on war housing and from now on a more substantial type of house will be built as materials and manpower become available.

Summary

We may have thought, a few weeks ago, that half the war was about over—we know now that barring unforeseen developments, much bitter fighting lies ahead. For all users of civilian goods this means another notch taken in the belt. Until VE day we ought not count on any better position than we had in 1944—no more materials or equipment and no more manpower. To do our bit to help win the war—with what we have—is our job in this gigantic struggle.

H&C DAMPER REGULATOR SETS



No. 40 $\frac{1}{4}$ S

ECONOMY TYPE. Three ways to install: 1. With lock nut but without handle (for tamper-proof setting). 2. With handle and lock nut. 3. With handle and wing nut. Nut prevents damper vibration. Handle always indicates position of damper (Patent 2,146,142). Furnished with handy snap end bearing. Complete set in carton. Made only with $\frac{1}{4}$ " bearings.

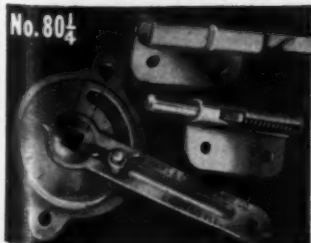
LIST PRICE.....No. 40 $\frac{1}{4}$ S.....\$0.30



No. 50 $\frac{1}{4}$ S

BRACKET TYPE. Nut holds damper securely, preventing vibration. Handle which indicates position of damper, may be left in place permanently or removed after adjustment (to prevent tampering). Snap End Bearing on $\frac{1}{4}$ " size, Solid Bearing on $\frac{3}{8}$ " size. Each set individually packaged.

LIST PRICES.....No. 50 $\frac{1}{4}$ S.....\$0.40
No. 50 $\frac{3}{8}$ \$0.60



No. 80 $\frac{1}{4}$ S

DISK TYPE. Like all H&C sets, this set is equally adaptable to splitter or regular dampers. Snap End Bearing on $\frac{1}{4}$ " size, Solid Bearing on $\frac{3}{8}$ " size. All parts are rust proofed. Complete set in carton.

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See your jobber or write for literature and sample.

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YOUR BLOWER Requirements

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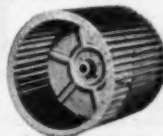
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Double Inlet and Single Inlet

HY-DUTY Blowers, 9 $\frac{3}{4}$ " to 25" • Top and Bottom Horizontal, and Top and Bottom Vertical Discharge • Top and Bottom

Motor Mounting • Dual Units also available.

★ **CENTER DISC WHEEL**—Double Inlet, Double Width • Reinforced Center Disc • Designed for Modern Air Conditioning and Heating Applications • Sizes, 4 $\frac{1}{2}$ " to 50".



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For hand-fired domestic heating plants. No sprockets or rotating arms to get out of order. In case of current failure, draft damper closes automatically; check opens. Finger-tip adjustment, synchronized settings. 2-wire low voltage control. Smart Mirror-Lite finish.

No. 130, Furnace Sentry Unit Package, complete with thermostat, damper motor and accessories—ready to install. **LIST PRICE...\$19.50**

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AUBURN, N. Y.
A RELIABLE NAME IN TEMPERATURE CONTROLS



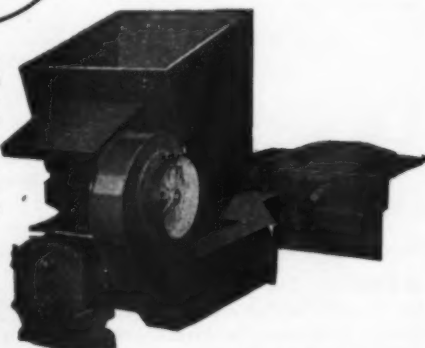
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Do you get all the heat you pay for? Do you get every bit of heat out of every pound of coal? Here's what users say about FREDERICK Stokers:

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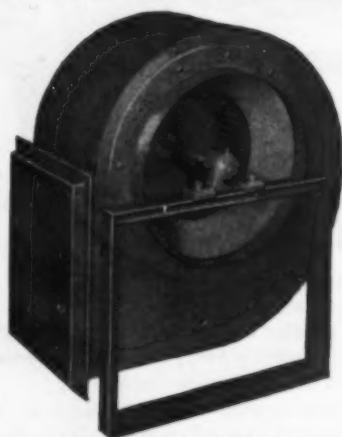


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Forward Curved Blades

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DETROIT 2, MICH.
7644 WOODWARD AVE.

Product and Product Engineering

(Continued from page 162)

at least in the start, favor the businesses run by war workers and the men who have had army or navy training in sheet metal work.

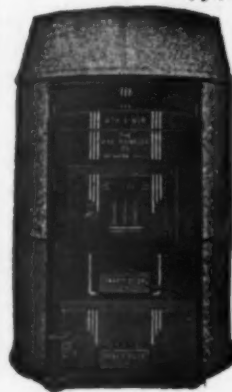
Planning for Competition

So it is agreed that legitimate competition between shops and factories now doing sub-contract work will be keen once the government-subsidized work ceases and we must count on such competition as will appear, no matter in what form, from the "new crop" sheet metal workers who, no matter how bad the system under which they worked, still will have the advantage of knowing machinery and tools and coordinated production. It will not be feasible, at least not in the instance of the army and navy trained men, to bar them from entering business by any such kind of licensing system as prevails in the plumbing trade. The public will side with the ex-service men.

So, after everything is considered and the pros and contras weighed, it appears that only scientifically grounded, well conceived and systematized product and production planning will guarantee success and survival. It may be, and in the majority will be, old products modernized and produced by more systematized, more efficient production. It can also be new products if we research the field and select a product which we know will sell at a profit in our own locality. If it sells in your own town, it will sell elsewhere.

Technical schooling has made great strides in the

ATH-A-NOR Furnace Repair Parts



The furnace choice of dealers who know performance and saleability has been Ath-A-Nor for more than 50 years. Quality, economy and efficiency have always distinguished the Ath-A-Nor line. Replace with Ath-A-Nor to insure maximum performance and fuel economy! And continue to pile up scrap for munitions and see that it reaches government agencies speedily!

MAY-FIEBEGER COMPANY

MANUFACTURERS OF QUALITY HEATING EQUIPMENT FOR
OVER 50 YEARS

NEWARK, OHIO

last two decades. Colleges have cooperated with the Army and the Navy to turn out more and better technically educated men. And although "experience" is worth much (in many cases surpassing schooling without experience) in the times ahead it will be both schooling and experience which will determine who survives. The individual who has fairly well succeeded in the past by his ingenuity and application will still be marked for success in the post-war period if he combines his own ability with the knowledge and experience of others.

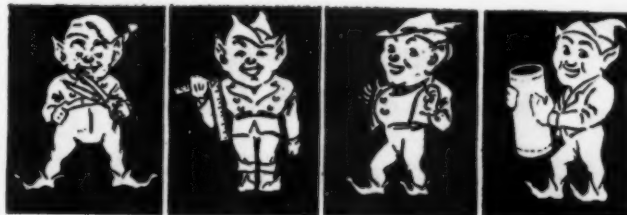
Wage Incentives

(Continued from page 117)

and clock hours for the day are added up and recorded on the payroll. At the end of the week the "earned hours" and clock hours for the week are added up and compared, and the worker is paid on the basis of whichever is the greater.

"How can you put workers like stockroom clerks or sweepers on standard?" is a common question. The answer is, "You can't." They are usually paid on the basis of what is termed "indirect incentive"; that is, they are paid on a bonus which fluctuates, depending upon the average bonus earned by the productive workers in the shop.

Of course, I have given only a bare outline of the incentive plan. To give all the details would be almost impossible in an article of the type. In case you are considering installing an incentive system, the WPB, in conjunction with the WLB, maintains a service for



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WILLIE

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4 Little "Fitting" Guys Fighting For You!

Will cuts installation costs—Willie makes fittings fit—William keeps prices down to bed rock—and Bill sees that there is stock near you.


FLASH NEWS! Complete, simplified line Gravity Pipe and Fittings now available on rated orders.

FREE: Complete, easily understood gravity pipe and fittings catalog showing full simplified line. Write Dept. 2 for prices and catalog.

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- Engineered to do a better job for more years by a 77-year-old company.
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They are used in the manufacture of explosives and ammunition, flame arresters, airplanes, battleships and in many important and essential industries such as the processing of grain, food products, chemicals, metals, coal, petroleum, etc. We make all sizes and shapes of holes to meet the most exacting conditions.



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CIRCLES! CURVES! ODD SHAPES!

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Made in sizes up to 60-in. throat, 10-gauge capacity

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COMPANY**

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MODEL
1236
36-in. Throat
12-Gauge
Capacity

SHEET METAL MEN should know more about this machine



KALAMAZOO
Metal Cutting Band Saw

**SAVES
EVERY
DAY
in your
SHOP**

Why let high priced labor cut by hand—lengths of angle iron—rods—tubes—bars, etc.—when this low priced machine does these jobs with amazing Speed and Accuracy? Pays for itself in Labor Saving and Steps up Production. Scores of shops say “just what we’ve always wanted.”

Write for bulletin.

MACHINE TOOL DIVISION

Kalamazoo Tank & Silo Co.

Kalamazoo 16, Michigan

the benefit of companies desiring information on this subject. Before engaging any professional services, it would be advisable for you to contact your regional division of the WPB. This board retains men who are experts, and their services are free. In any case, it will be necessary to make a complete presentation of your plan to the WLB and the WPB and to secure their approval before you can legally put it into effect. By taking advantage of this service you may be able to save yourself many dollars.

Complete Cooperation Needed

Before deciding on the installation of a wage incentive system, bear in mind that the rate setter must have the complete cooperation of the office and the shop forces. It is often necessary for him to consult the shop supervision on points of manufacturing procedure. For this reason he must also have the cooperation of the supervisory employee if the system is to be a success. Too often the attitude of the shop supervisory employees is “I’m too busy to be bothered with this rate-setting nonsense.” On the other hand, when the rate setter goes ahead on his own initiative, the reaction is, “Why wasn’t I consulted?” An incentive system will be a tremendous failure in an organization where the supervisory employees have not learned to work together.

In conclusion, let me say that an incentive plan is no “magic wand.” It is not like a machine that can be purchased and then expected to perform its functions automatically; it requires much hard work and constant attention. It solves some problems, but it creates many others. Its installation alone requires patience, persistence, trained personnel, and a considerable investment of time and money.

THIS is a RADIATION FURNACE



WILL NOT COST MORE FOR OIL THAN FOR COAL

SPECIALLY designed to be used as an oil furnace, the Radiation Furnace has everything in engineering and construction that a good furnace should have. It has from eight to sixteen heat transmitting walls, depending on the size of the furnace; there are no dead pockets in the radiators; primary heat does not interfere with secondary heat.

In the Radiation Furnace hot gases are directed so there is a continuous flow from the upper to the lower sets of steel flues which absorb and transmit the heat to the home before it escapes through the chimney.

Radiation Furnaces cost no more for oil than for equal efficiency with coal. Write for complete details today.

RADIATION FURNACE CORPORATION

Benton Harbor, Michigan

.50 Caliber Ammunition Boxes

(Continued from page 178)

rial must be made to precise tolerances. Production is quite like the ammunition box. The breather tank is a small aluminum casting to which must be welded numerous fittings—each exactly in position. Not pictured are “dropable tank straps” which hold auxiliary gasoline tanks to planes and can be dropped by pushing a lever; “fire cut-off cams” which prevent a rear gunner shooting off his own elevators or rudder—both of these are stainless; and “glider leading edge wing fairing” a two-part aluminum pressing, spot welded together.

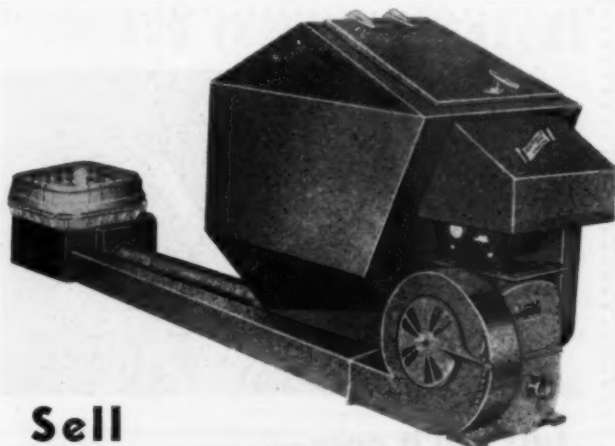
In addition to these war items, Allen's line of ventilating equipment continues to come off the lines in quantities exceeding normal production.

Kruckman-Reconversion Is "On the Shelf"

(Continued from page 113)

we will need European manpower, and Russian manpower, for the final drive on Japan.

Above many other things we need many kinds of ammunition, guns, tires, motor vehicles, tanks, planes, and other equipment for the Japanese war and the European war. Apparently we have underestimated some of our needs. It is unimportant to speculate who failed to make the proper estimate, and why some things were left undone. We now know they



Sell Schwab Safe Stokers!

To be *safe* on profit, efficiency and economy, sell Schwab Safe Stokers . . . engineered and built to give the longest years of trouble-free service . . . backed by 70 years of manufacturing experience. There's a Schwab Safe Stoker for every domestic, commercial and industrial need.

Write today for full details on the fine Schwab Safe Stoker dealership!

THE Schwab Safe Company
LA FAYETTE, INDIANA

BOOST PRODUCTION SCHEDULES WITH

MARSHALLTOWN THROATLESS SHEARS

★
CUT ANY SHAPE

★
**CUT ANY SIZE
SHEET**

★
Here's just the Shear that offers every feature you want. It does hundreds of odd shearing jobs better and faster—yet is an inexpensive hand operated tool. No matter what type of cutting—either irregular shapes or straight splitting—from ANY size sheet, you'll quickly find that the Marshalltown Throatless Shear is the most profitable tool in the shop.



No. 18
HAND
POWER

Get Special Shear Bulletin today. Gives details of sizes from 18 gauge to one-half inch capacity.

MARSHALLTOWN MFG. COMPANY

920 E. Nevada St., Marshalltown, Iowa



PENN-AIRE FURNACES

GRAVITY, CAST IRON

**Popular Price
Practical Design
Economical Operation**

UNION MANUFACTURING CO., INC.
BOYERTOWN, PA.

**MAKES
LEAD-RICH
SOLDERS AND
SILVER-LEAD
SOLDERS
WORK LIKE
MAGIC!**



**Write for
FREE
Sample**

LLOYD'S No. 6 SOLDERING FLUID

(Non-Acid)

Here at last is a soldering fluid that gives outstanding results with all soft solders including lead-rich Victory Solders! It breaks down these solders into an absolute fluid. It is an ideal flux for Zinc-coated Sheet Metal, Tin Plate, Terne Plate, Brass, Copper and Steel. It's economical—a gal. makes 2 to 3 gal. high quality flux. Try it yourself—be convinced of its superiority. Write for literature and FREE sample today!

LLOYD S. JOHNSON COMPANY
2241 Indiana Ave. Chicago 16, Ill.

SOLDERING TECHNICIANS

**FOOT POWERED
SHEAR CUTS COSTS**



- ✓ **SMALL INVESTMENT**
First Cost Is Only Cost
- ✓ **NO OPERATING EXPENSE**
Except for Labor
- ✓ **SIMPLE TO INSTALL**
Unpack and Start Shearing
- ✓ **EASY GAUGE SETTINGS**
Simple, Fast and Sure
- ✓ **ACCURATE SHEARING**
Cross Head Reinforced
- ✓ **EFFORTLESS OPERATION**
With Balanced Leverage

Famco FOOT POWERED Squaring Shears cut up to 18 gauge mild steel with ease. Made in five sizes . . . 22", 30", 36", 42" and 52" cutting widths (three largest have "hold down" attachment). The knives of all models have tool steel cutting edges. Compression springs are encased against breakage. Furnished with front, side and back gauges. Write today for full information on the Famco line of low cost Squaring Shears.



POWERFUL PRESSES THAT NEED NO POWER

Famco Foot Presses, made in 10 models (bench and floor stand types) are widely popular for light forming and stamping operations.

Famco Arbor Presses deliver up to 15 tons pressure without power cost. Make assembly or dismantling easy. 32 models, in bench or floor types.



FAMCO MACHINE COMPANY, 1314 18th STREET, RACINE, WISCONSIN

famco ARBOR PRESSES
FOOT PRESSES
SQUARING SHEARS

must be done; and the major need obviously is that they be done as swiftly as possible; and that every resource be focussed on producing in overwhelming abundance the things that are needed. It is better to be abundant than to be sorry about another break through.

We hear now about 23 or 45 or 75 items that are short, or are critically scarce. We hear about 30,000, or 100,000, or 250,000 men who are lacking in war industries. It is irritating to realize there is confusion about important data. But in the end it does not matter very much in the large whether the number is this or that. The fact we know positively is that we are short of war products, and that more men are needed in war jobs. It is very clear that the lacking items will be supplied, and that workers will be found to do the job. It still remains uncertain how much force must be applied to impel workers into the jobs.

Workers "Draft" Only Possibility

It is regarded as quite possible here that some form of work draft will be devised and enacted by Congress. The armed forces are the dominant influence in practically all, perhaps actually all, Government agencies. The Army is said to need approximately 1,000,000 men in addition to the natural monthly increment which is reported to have totalled about 60,000 men every 30 days. Inductions now are reported to have been stepped up to something exceeding 100,000 men per month. They are expected to go higher. Manpower losses resulting from the German offensive have not been reported. It is expected the most immediate draft will be made on those ranging from 26 to 29. It is also anticipated men between 30 and 38 will be inducted, although the Army is not inclined to take



Just use it once—

The Alnor Velometer

gives you instantaneous, direct readings of air velocity in feet per minute. Hold it in the air stream for low range readings; use the tube-connected special jets for high range readings or inaccessible locations. That's all there is to it, and once you use the Alnor Velometer you will never tolerate other methods.

The Alnor Velometer is built in several standard ranges from 20 fpm to 6,000 fpm, and up to 3 inches static or total pressure. Special ranges available as low as 10 fpm, and up to 25,000 fpm and 20 inches pressure. Write for Velometer bulletin.

ILLINOIS TESTING LABORATORIES, INC.

420 NORTH LA SALLE STREET
CHICAGO 10, ILLINOIS

men 30 and over. Farm boys also will be called. By one way or another the 4-F's who have avoided war jobs are to be forced into war work. It will be an uneasy time from now until mid-summer, and possibly later, for those in draft categories.

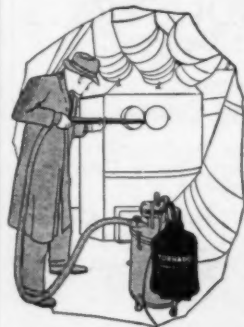
The pressures, which will cause workers to be shifted from one job to another, also will squeeze women into more essential jobs. All this obviously points to the fact that plants, large and small, will be wise to qualify for war contracts, either directly or indirectly. Many plants are taking on part-time war contracts, and are working on nonwar jobs in intervals. Apparently WMC and USES are inclined to approve. The arrangement has enabled many smaller plants to keep their heads above water, and to qualify for manpower, materials, and other essentials. The Smaller War Plants Corporation is ready to help the smaller plants, especially those in the metal processing industries, to secure contracts or subcontracts; and to smooth out the difficulties that might beset them from various Government sources.

Domestic "Pattern" Is Vague

It seems that there is lacking a sense of clear direction in the course of domestic Government. There is, obviously, a pattern, but it is vague. Some Government men say they feel as if they were drifting in a fog. In Nelson's days at WPB we had turmoil and travail, but there was leadership. Today we feel the lack of the leadership. This is true of practically every agency except one: the new Office of War Mobilization and Reconversion. Justice Byrnes obviously has assumed the responsibility of his office with the deliberate intention of carrying on without looking anywhere else for direction or approval. He seems

TORNADO FURNACE CLEANERS

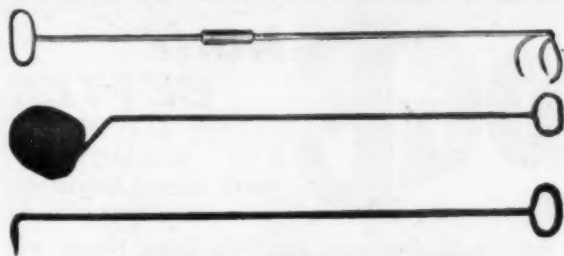
Now Available!



TORNADO Furnace Cleaners are a sure way to cut fuel costs, prevent trouble and deterioration. Compact and portable, they can be taken into the basement and moved up close to the work to do a quick, effective job. Tornado Furnace and Boiler Cleaners use only full size, genuine G. E. motors, with ruggedness and power, and equipped with tools to do a better job, saving time, effort and money. Request details.

BREUER ELECTRIC MFG. CO.

5082 Ravenswood Ave., Chicago 40, Illinois



ADAMS FIRING TOOLS

CLINKER TONGS
ASH REMOVERS

FURNACE POKERS
FIRE RAKES

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Buy Adams Known Quality
THE ADAMS COMPANY

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JOHNSON

BENCH FURNACES

No. 118

Combination Bench Furnaces

No forced air blast required for this handy furnace. Use it for heating largest soldering coppers, branding irons or tempering, heat treating, annealing case hardenings or soft metal melting. Removable lid on hood permits using 22 lb. capacity melting pot.



No. 101

Powerful, efficient, economical. Gives 1800° F. without a blower. Write for details and prices.



FREE Illustrated Johnson Catalog showing complete line of furnaces.

Parts available for any Johnson Furnace built since 1901.

JOHNSON GAS APPLIANCE COMPANY

580 B. Avenue N. W., Cedar Rapids, Iowa



DISTINCTIVE FEATURES — The soft steel blades are made in pairs, pressed thru slots in the heavy steel back plate, then welded to the plate. The blade tips are pressed thru slots in the inlet disc then bent back against the spring of the steel blades. This patented construction results in an exceptionally rigid wheel and prevents loose blades, as no rivets are used in fastening the blades. The heavy cast iron machined hub is riveted to the back plate and will not crack or become loose on the shaft.

Janette

Janette Manufacturing Co. - 556-558 W. Monroe St. - Chicago, Ill.

Cut Sheet Metal "Easy as Pie"

with **Black & Decker**

Lectro-Shears

Lectro-Shears cut straight lines, irregular patterns or curves down to $\frac{3}{4}$ " radius. Cutting operation always visible. Two models, 18 and 16 gauge, cut up to rated capacity in steel, 50% more in non-ferrous metal. Universal motors. See your Black & Decker Distributor, or write to: The Black & Decker Mfg. Co., 324 Pennsylvania Ave., Towson 4, Maryland.



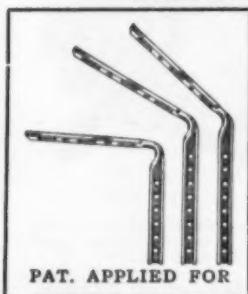
16-gauge . . . \$76

18-gauge Model . . . \$60

Black & Decker
Portable Electric TOOLS

DRILLS, HOLE SAWS, DRILL STANDS, LECTRO-SHEARS, BENCH GRINDERS, SANDERS, PORTABLE GRINDERS.

IMPROVED!



PAT. APPLIED FOR

• B B •

No. 12 SHANK

33 1/3% STRONGER

IMPROVEMENT IS APPLIED TO No. 15—SQUARE, No. 12—1/2 PITCH, AND No. 25—1/2 PITCH.

SOLD THRU LEADING JOBBERS EVERYWHERE

BERGER BROTHERS CO.

Main Office & Factory
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CHENEY METAL

- SUPERIOR TO GALVANIZED IRON
- WEATHER PROOF
- FIRE RETARDANT
- MOISTURE PROOF
- FORMS EASILY WITH REGULAR SHOP TOOLS

CHENEY METAL PRODUCTS CO. TRENTON, N.J.

WRITE FOR DESCRIPTIVE FOLDER AND THE NAME OF YOUR NEAREST DISTRIBUTOR

The Modern
SHEET METAL

to be working more closely with Byrnes and with Congress than with any one else. The effect of this knife-edge decisiveness already is bringing results. Those floundering around for lack of a chart are turning hopefully to Byrnes. And his decision and action not only has put life into many officials of Government, but has obviously aroused the attention of business folk in all parts of the country. It is clear the people increasingly are looking hopefully to Byrnes for leadership.

The general supposition here is that Byrnes has made up his mind to obey the law and his conscience, and to serve the need of the people, and to carry on until he finds his difficulties are too great. You people at a distance may not be able to sense that a man in the White House group is constantly under the critical scrutiny of others in the White House who may have other objectives. Unquestionably Byrnes is subject to pressures none of us can either see or even feel. A man in Byrnes' position, and who seeks to do a job as Byrnes' apparently is trying to do it, walks a tight rope, always.

Cut-backs and Reconversion

Now, finally, about cut-backs and reconversion. The whole cut-back to civilian production clearly has been set back indefinitely. The armed forces naturally are ruthless in suppressing any tendency to relaxation or easing off into civilian production. The thought here is that this tight control will largely be maintained during the course of most of the Japanese war. But when cut-backs come, after V-E day, it is anticipated they will be sharp, abrupt, without warning or tapering off. And with the cut-backs it is expected there will be many strikes. We are now spending approxi-

Complete Refractory Service to the HEATING INDUSTRY...

PETCO

Interlocking Combustion Chambers . . . Baffles
Insulating Cement . . . Steel Furnace Linings

PECORA

Pecora Asbestos Furnace Cement, Stove Cement, and Boiler Putty

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Fire brick, hearth and baffle mix, cupola block, plastic furnace lining

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DOWAGIAC, MICHIGAN

FEW AS GOOD

Stokers
Handy Fittings
Repairs

All genuine Gilt Edge repairs carry a label saying "Genuine Gilt Edge Part." We have genuine Gilt Edge repairs for Gilt Edge Hummer, Gilt Edge Crescent, Gilt Edge Radium, Gilt Edge Badger, Gilt Edge Liberty, Gilt Edge Solar, Gilt Edge Fireside, 500, 600, 700, 800

SCHWAB FURNACE CO.

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FURNACES

NONE BETTER

Blowers
Rock Island Registers
Humidifiers

and 900 Series Furnaces and Gilt Edge Round and Square Boilers. We are successors to the Schwab & Sercomb Co., R. J. Schwab & Sons Co., and the Schwab Furnace & Mfg. Co. Buy from jobbers who carry genuine Gilt Edge repairs or write us. We can furnish a Gilt Edge Furnace on the proper priority.

193 SOUTH SECOND STREET
MILWAUKEE, WISCONSIN

mately \$90,000,000,000 a year on our wars. It is *guessed* when the German war ends the annual outlay for war will drop to \$60,000,000,000. Production by industry is expected to sag 25%. There is expected to be a cut in war industry totalling approximately 50%. On the other hand, civilian industry is expected to jump about 33%. The deepest cut in the war industries is anticipated in communications and electronics, 80%. Shipbuilding is expected to take a 75% cut; motor vehicles and combat equipment production, 60%; a miscellany of production of other supplies and equipment is expected to drop 50%; and aircraft is considered to be confronted with 30% reduction. Individuals, who now receive income payments at the rate of \$158,000,000,000 per year, are expected to take a cut of \$16,000,000,000. And, after V-E Day, it is anticipated within 6 months approximately 5,000,000 workers will be unemployed.

A Type And Size For Every Need

For efficiently controlling light and medium dampers in heating, ventilating and air conditioning systems, specify Parker-Kalon Damper Controls. The line includes all types and sizes, at a range of prices to fit the needs of any job. Parker-Kalon Corp., 190-192 Varick Street, New York.



PARKER-KALON damper controls

UTILITY Appliance Corp.

Formerly Utility Fan Corporation

Evaporative Air Coolers • Propeller Fans
Standard and Heavy Duty Blowers
Industrial Exhausters
and Gas-Fired Heating Equipment

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UTILITY

LOS ANGELES 11

Start the Year RIGHT... with RUBYFLUID!

FAST ACTING . . . EASY-TO-USE . . . ECONOMICAL



Available in liquid or paste flux; also Ruby's Stainless Steel Flux.

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RUBY CHEMICAL CO.

Rubyfluid



PLANING MILL EXHAUSTERS

DIAGRAM shows how special streamlined inlet deflects airstream so as to reduce turbulence and back plate erosion. Result: higher over-all efficiency, lower maintenance cost, less time out for service and repairs.



SEND FOR DETAILS including performance and dimensions in Catalog 410.

B. F. STURTEVANT COMPANY.
HYDE PARK • BOSTON 36, MASS.

STATE SUPPLY CO.

WHOLESALE DISTRIBUTORS
SHEET METAL FURNACES
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MANUFACTURERS

Are You Looking For An
AGGRESSIVE DISTRIBUTOR?

We are a well-established, financially sound firm distributing a number of nationally known lines in Northeastern Ohio. We are interested in establishing new lines...for after the war...NOW. Write for more information.

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COMING ATTRACTION

EXTRA FEATURES
BETTER
THAN EVER
WATCH FOR IT

Majestic FURNACES
For Better Heating
A BIG HIT year after year
Booked Exclusively by established dealers
40 Years of Successful Performances

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MONMOUTH HUMIDIFIERS

- For all warm air systems.
Descriptive Bulletins and prices
on request.

Formerly made by Monmouth Products Co.
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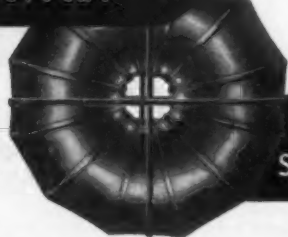
How many

EXTRA War Bonds

have you bought since
the 6th drive closed?

IMMEDIATE DELIVERY
FROM STOCK!

CONDUCTOR
PIPES, TOO!



ELBOWS &
SMOKE PIPE

KRAUSER-BOYD, INC.

553 RIVER ROAD • N. TONAWANDA, N. Y.

Leader

**KOOLSTACK
FURNACES**

FOR STOKERS

OIL or HANDFIRED

50,000 to 200,000 BTU's

Patented Damper
Uses All the Heat
in the Added Heat-
ing Surface

THAT
IS SOMETHING
TO SELL

LEADER IRON WORKS, Inc.
Decatur Illinois



WAR TIME TR

Williams Oil-O-Matic Heating Corporation, Bloomington, Illinois, announces the receipt of a fourth Army-Navy "E" Production Award.

In commenting on this latest official recognition of Williams Oil-O-Matic war work accomplishment, W. A. Matheson, President, said, "Naturally, we are very proud to have again won this coveted honor. But what particularly pleases the men and women of Williams Oil-O-Matic is the fact that they achieved this goal of continued excellence in war production without interrupting the plans that will put new Williams Oil-O-Matic Heating Equipment in dealers' hands just as soon as materials are available and government regulations permit."

When they return to civilian status, men and women in the armed services who were formerly employed by the Ilg Electric Ventilating Co. of Chicago will get a bigger share in the profits of the Company as well as their old jobs, according to executives of the Ilg Welfare Club.

The notification, which was sent to all former employees now in uniform, states that upon their return the veterans will enjoy the same profit-sharing as if the time had been spent with the company.

The Ilg Profit-sharing program was originated in 1907. After 37 years the original plan is still in force. Under its terms, each employee's earnings for the year are taken as a basis for determining his share of the profits.

Aeroil Burner Company, Inc., 5701 Park Avenue, West New York, has won the Army-Navy "E" Award. In addition to the manufacture of war material for the Armed Forces, Plant No. 1 is the production center for the Aeroil line of "Heet-Master" kettles—heated from the inside, by means of the patented Aeroil immersion tube system. Aeroil has branches in Chicago, Dallas and San Francisco, but within the past year two additional plants have been established in New Jersey to meet the increased requirements of World War II.—George P. Kittel, President.

Minneapolis-Honeywell Regulator Co., Minneapolis, completed in November the 30,000th electronic automatic pilot for precision bombing aircraft, the companion piece to the Norden bombsight.

The Autopilot is used to hold bombers straight and level during the course of their bombing runs, is capable of making more than 300 flight corrections a minute, and relieves pilot fatigue.

→ Vernois ← ORIGINAL REPAIR PARTS

Insist On Them!

Vernois furnaces have proven their fine workmanship and operating efficiency during war times . . . when you repair Vernois furnaces use nothing but original Vernois repair parts. Order them direct from the manufacturer.

MT. VERNON FURNACE & MFG. CO.

MT. VERNON, ILLINOIS

TRADE NEWS



E. K. Campbell Heating Co., Kansas City, Mo., has several contracts with the Army to furnish heavy duty fan furnace units—two just now ready for delivery to the Army Air Force Supply Department, Memphis, Tennessee—each unit 3,000,000 Btu.

All present business is essential and carries priority, although probably not more than 25 per cent consists of war orders.

Clarence E. Gay, Jr., has come from New York and is training to design engineering.

The following are now in service:

Capt. A. Q. Campbell—Manager of the Nashville office

Roger P. Campbell—succeeding A. Q. as manager of the Nashville office

O. O. Elliott—Superintendent at Nashville and designing engineer

E. K. (Kirk) Campbell, Jr.—recently returned, and is now vice-president in charge of production

John M. Robertson—Manager, St. Louis office

Roger P. Campbell is in quite a responsible position for his shift in the South Boston Navy Yard on repair work. Both he and O. O. Elliott are expecting to see service in the Pacific. A. Q. Campbell has been an instructor in artillery at Fort Sill, Okla. One nephew, Mr. Campbell understands, is in command of an Artillery Battalion in an advance from Aachen. E. K. Campbell lost one nephew in action in the Pacific.

Buffalo Forge Company, Buffalo 5, N. Y., has received the third renewal of the Army-Navy "E" Award. Buffalo received the first Army-Navy "E" Award for production of ventilating fans, and is still supplying the Navy with a large part of its fan requirements.

Buffalo Pumps, Inc., a subsidiary, was awarded a fourth renewal star in July, 1944.

L. J. Mueller Furnace Company, 2005 W. Oklahoma Avenue, Milwaukee 7, has quite a number of employees from the sales, engineering and office forces in the armed forces. One is now a Lieutenant Colonel in the U. S. Army Air Force, another a Major in the U. S. Army, and a third a Captain in the Army. There are 112 Mueller employees now active in the Armed Forces, a large percentage of whom are overseas. There is one Gold Star on the Mueller Honor Roll. Mueller employees increased their War Bond purchases by more than 200 per cent in the Sixth War Loan Drive over the Fifth War Loan Drive.—W. E. Haase, Sales Promotion Manager.

GRAY'S FULL SIZE BLUE PRINT PATTERNS ARE A GREAT TIME SAVER

SHIP VENTILATOR PATTERNS

From 4" to 48" dia. of base, in sets and single sizes.

ELBOW PATTERNS IN TWO SETS

SET No. 1—1" to 20" in 2-3-4-5-6-7 piece, including

T PATTERNS 2" to 20"—152 Patterns.....\$2.50

SET No. 2—20" to 40" in 5-6-7-8-9 piece, 105 Patterns,

including elbow chart, showing what pattern and

number of pieces for required angles, also gives the distance between

seams in throat for any required radius up to 96". With the two sets is

included a circumference chart showing every 1/4" up to 96" dia.

SETS No. 1 & No. 2 post-paid.....\$5.00

45 Degree BRANCH PATTERNS IN TWO SETS

SET No. 3—2" to 12" on 2" to 30"—190 Patterns.....\$5.00

SET No. 4—12" to 24" on 12" to 48"—195 Patterns.....\$5.00

SETS No. 1-2-3-4 cover everything in blow-pipe work. Patterns sent by re-

turn mail post-paid upon receipt of P.O. order or check for \$15.00.

G. L. GRAY

507 Grand Avenue
NEW HAVEN 3, CONN.

Write for pattern circular giving full information.

Mention American Artisan.



DASCO Forged HAND TOOLS



Chisels, punches, drills, nippers and numerous other hand tools . . . quality built for long service. Sold by leading jobbers.

DAMASCUS STEEL PRODUCTS CORP., ROCKFORD, ILL.

REPAIR PARTS

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STOVES—FURNACES—BOILERS

Also

MODERN AIRE FURNACES

Fittings, Registers, Supplies

DES MOINES STOVE REPAIR CO.

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DES MOINES, IOWA
Since 1869

Effective
Roof
Ventilation



Airidge Ventilation

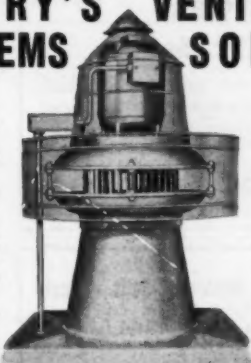
All materials and sizes. Shipped in 10-ft. lengths. Dampers optional.

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INDUSTRY'S VENTILATING PROBLEMS SOLVED!

No belts to slip. Direct connected. Sets up on the roof out of the way of everything. A com-



pact, self-contained unit easily and cheaply installed. Write for details now, Dept. 9.

THE GALLAHER CO., Owatonna, Minnesota

Bremil PORTABLE SHEARS



Your work will proceed faster and neater when you use Bremil Portable Shears on the job or in the shop. Write today for literature showing complete line.

ALL-ALLOY No. 2 cuts up to 1/4" steel plate.
ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet.
Special blades may be obtained for shearing stainless steel.

BREMIL MFG. CO., ERIE, PA.



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FOR ANY
FURNACE, BOILER
OR STOVE**

*Complete Line of
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OMAHA STOVE REPAIR WORKS

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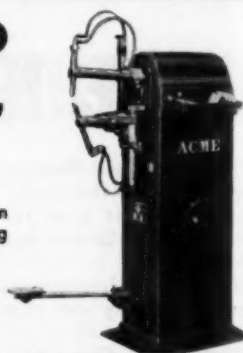
SPOT WELD WITH AN ACME "Hot Spot" WELDER

Proven utility for over 26 years in thousands of sheet metal fabricating plants.

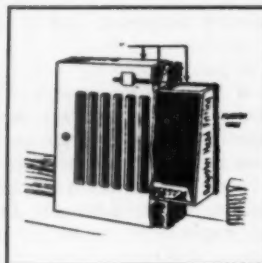
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**\$19.85
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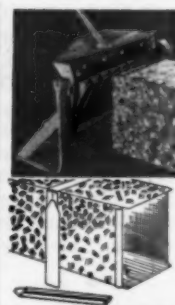
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NO. 12
Takes All Sizes Up to 12"

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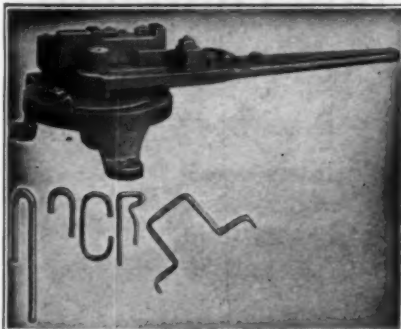
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Yards 5800

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ROLLS, ANGLE: 6 x 6 x 6 1/4" WICKES, Triple Back Grd.; **LEVELLER:** 5' NILES, 63" rolls, 6 1/4" dia., 54" McKAY, ROLLER; 48" x 10" GLOBE HYD.

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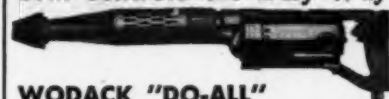


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* Finer, more uniform spray.
* Effective operation at low pressures. * No internal parts to clog or wear.

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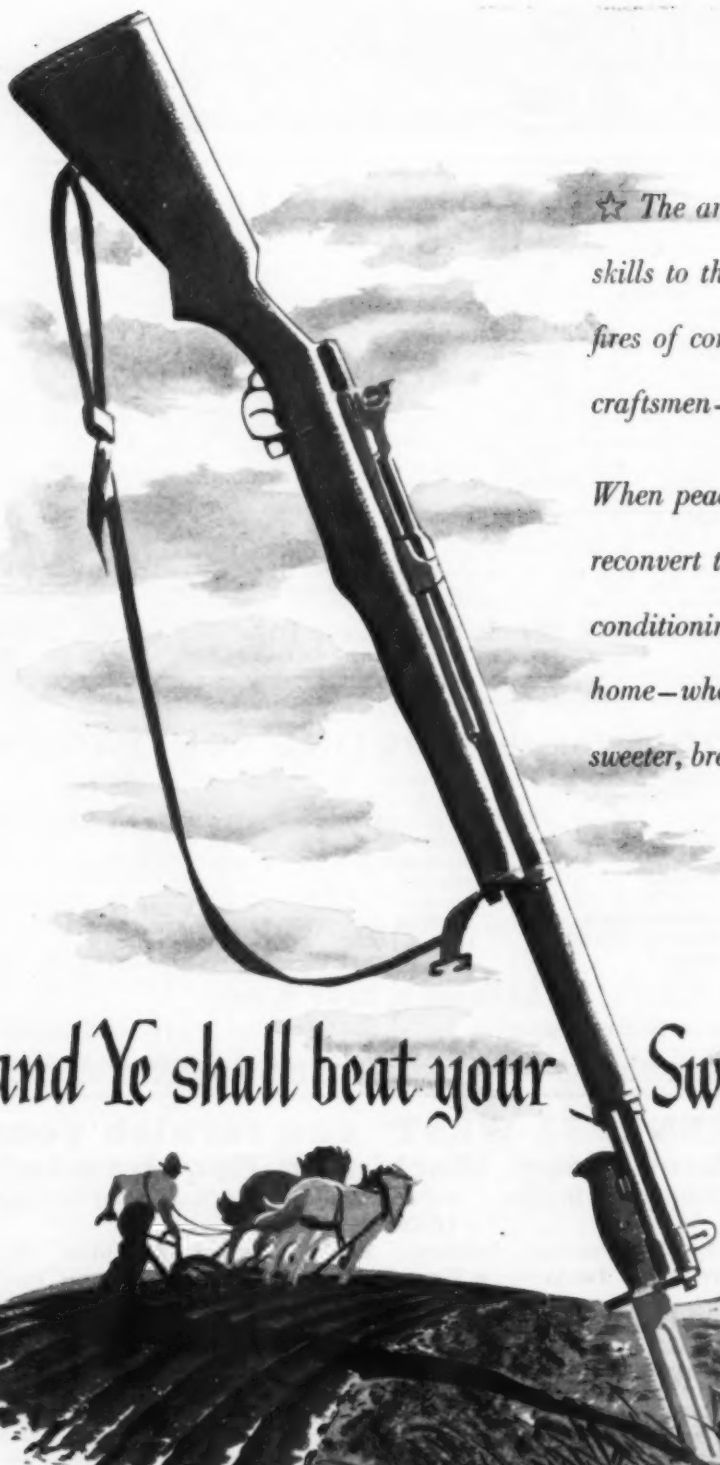
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Saves time and money installing expansion anchors. Drills concrete to 1 1/4" dia.; metal to 3/4". Two tools in one. Easy to maintain. Universal motor. Star drills in 17 diameters. Also chisels, bull points, etc. Write for bulletin No. 644.

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..and Ye shall beat your Swords into Plowshares

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Steel Furnace Company

Section of
JANUARY, 1945
AMERICAN ARTISAN

1945
DIRECTORY

OF WARM AIR HEATING, RESIDENTIAL AIR
CONDITIONING AND SHEET METAL PRODUCTS

Section 1.—Products Classified Page 237

If you want to know the names of one or more manufacturers making a certain product, look in Section 1, where products are classified alphabetically in directory style with the noun governing (for instance, Warm Air Furnaces are listed as Furnaces, Warm Air).

Section 2.—Trade Names Page 291

If you have the trade name of a product and want to know who manufactures it, look in Section 2, where trade names are alphabetically listed. Trade names the same as or identifiable from the company name are not listed. Manufacturers with such trade names can be readily identified under their product classifications in Section 1.

Section 3.—Manufacturers' Addresses Page 310

For the complete name and address of any manufacturer, look in Section 3.

● The manufacturers whose names are dotted throughout the listings advertise their products in this issue. Turn to Index to Advertisers, page 324, for the page on which you will find the advertising of any of these manufacturers.

Section of American Artisan

1945 DIRECTORY OF WARM AIR HEATING, RESIDENTIAL AIR CONDITIONING AND SHEET METAL PRODUCTS

[Section 1-PRODUCTS CLASSIFIED]

● The manufacturers whose names are dotted throughout the listings advertise their products in this issue. Turn to Index to Advertisers, page 324, for the page on which you will find the advertising of any of these manufacturers.

ADSORBERS, ODOR

Betz Corp., Hammond, Ind.
Carbide & Carbon Chemicals Corp., New York City.
Connor Engineering Corp., W. B., New York City.
Refrinite Corp., Omaha, Nebr.
Lundy Co., E. A., New York, N. Y.
Wheeler, Inc., W. H., New York City. (Air Freshening Compounds)

AIR CONDITIONING FURNACES

See Furnaces, Warm Air, Air Conditioning

AIR CONDITIONING UNITS, CENTRAL PLANT, SUMMER

(Self-contained fan, filter and cooling coil unit for connection to refrigerating compressor or cold water supply with duct distribution of air)

- Air Conditioning & Refrigeration Div., Worthington Pump & Machinery Corp., Harrison, N. J.
- Air & Refrigeration Corporation, New York City.
- Airtemp Division, Chrysler Corp., Dayton, O.
- Allis-Chalmers Manufacturing Co., Milwaukee, Wis.
- American Blower Corp., Detroit, Mich.
- Bahnson Co., Winston-Salem, N. C.
- Baker Ice Machine Co., Inc., Omaha, Nebr.
- Beacon-Morris Corporation, Boston.
- Blower Application Co., Milwaukee.
- Buffalo Forge Co., Buffalo.
- Carrier Corp., Syracuse, N. Y.
- Clarage Fan Co., Kalamazoo, Mich.
- Conditionaire Unit Co., Chicago.
- Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis.
- Drayer-Hanson, Inc., Los Angeles.
- Fedders Mfg. Co., Inc., Buffalo.
- Forman Air Conditioning & Eng. Co., New York City (freon).
- Frigidaire Division, General Motors Corp., Dayton, O.
- General Air Conditioning Corp., Cincinnati.
- General Electric Co., Bloomfield, N. J.
- General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
- Governair Corp., Oklahoma City, Okla.
- Hastings Air Conditioning Co., Inc., Hastings, Nebr.
- Howe Ice Machine Co., Chicago.
- Ilg Electric Ventilating Co., Chicago.
- Jaden Manufacturing Co., Hastings, Nebr.
- Kauffman Air Conditioning Corp., St. Louis.
- Kennard Corporation, St. Louis.
- Kramer Trenton Co., Trenton, N. J.
- Lennox Furnace Co., Marshalltown, Ia.
- McCord Corporation, Detroit.
- McQuay, Inc., Minneapolis.
- Marlo Coll Co., St. Louis.
- Michell Air Conditioning Co., Inc., Schenectady, N. Y.
- Niagara Blower Co., New York City.
- Peerless of America, Inc., Marion, Ind.
- Pernot & Rich, Inc., Los Angeles.
- Premier Furnace Co., Dowagiac, Mich.
- Refrigeration Economics Co., Inc., Canton, O.
- Rempe Co., Chicago.
- Skinner Heating & Ventilating Co., Heater Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis.
- Stainless & Steel Products Co., St. Paul, Minn.
- Sturtevant Co., B. F., Boston.
- Surface Combustion, Toledo, O.
- Trane Co., La Crosse, Wis.
- U. S. Air Conditioning Corp., Minneapolis.
- Vilter Manufacturing Co., Milwaukee.
- Williams Oil-O-Matic Heating Corp., Bloomington, Ill.

● Advertisement in this issue. See Index to Advertisers, page 324.

X L Refrigerating Co., Inc., Chicago.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

AIR CONDITIONING UNITS, CENTRAL PLANT, WINTER, SPLIT SYSTEM TYPE

(Self-contained fan, filter, humidifier and heating coil unit for connection to steam or hot water boiler with duct distribution of air)

- Air Conditioning & Refrigeration Div., Worthington Pump & Machinery Corp., Harrison, N. J.
- Air & Refrigeration Corporation, New York City.
- Airtemp Division, Chrysler Corp., Dayton, O.
- Aladdin Heating Corp., Oakland, Calif.
- Allis-Chalmers Manufacturing Co., Milwaukee.
- American Blower Corp., Detroit.
- Bahnson Co., Winston-Salem, N. C.
- Beacon-Morris Corporation, Boston.
- Blower Application Co., Milwaukee.
- Buffalo Forge Co., Buffalo.
- Carrier Corp., Syracuse, N. Y.
- Clarage Fan Co., Kalamazoo, Mich.
- Fedders Mfg. Co., Inc., Buffalo.
- Fitzgibbons Boiler Co., Inc., New York City.
- General Electric Co., Bloomfield, N. J.
- Handelan Washed Air Co., Minneapolis.
- Hastings Air Conditioning Co., Inc., Hastings, Nebr.
- Jaden Manufacturing Co., Inc., F., Hastings, Nebr.
- Johnson Co., S. T., Oakland, Calif., and Philadelphia.
- Kauffman Air Conditioning Corp., St. Louis.
- Kennard Corporation, St. Louis.
- Kramer Trenton Co., Trenton, N. J.
- McQuay, Inc., Minneapolis.
- Marlo Coll Co., St. Louis.
- May Oil Burner Corp., Baltimore.
- Mayflower Air Conditioners, Inc., St. Paul.
- Michell Air Conditioning Co., Inc., Schenectady, N. Y.
- New York Blower Co., Chicago.
- Niagara Blower Co., New York City.
- Peerless of America, Inc., Marion, Ind.
- Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
- Refrigeration Economics Co., Inc., Canton, O.
- Richmond Radiator Co., New York City.
- Skinner Htg. & Vent. Co., Heater Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis.
- Stainless & Steel Products Co., St. Paul, Minn.
- Surface Combustion, Toledo, O.
- Trane Co., La Crosse, Wis.
- U. S. Air Conditioning Corp., Minneapolis.
- Western Blower Co., Seattle, Wash.
- Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
- Wood Industries, Inc., Gar, Detroit.
- York Heat Div., York-Shipley, Inc., York, Pa.
- York Corporation, York, Pa.
- Young Radiator Co., Racine, Wis.

AIR CONDITIONING UNITS, EVAPORATIVE TYPE, SUMMER

(For cooling with sprays, no dehumidification)

- Air & Refrigeration Corp., New York City.
- American Blower Corporation, Detroit.
- American Cooling Tower Co., Kansas City.
- American Metal Products, Fort Worth, Tex.
- April Showers Co., Washington, D. C. (Roof Spray)
- Aqua-Mist Co., Topeka, Kans.
- Bahnson Co., Winston-Salem, N. C.
- Blen Air Conditioning Company, Bell, Calif.
- Beacon-Morris Corporation, Boston.
- Beckett & Co., Thomas, Dallas, Texas.

Campbell Heating Co., E. K., Kansas City.
 Carrier Corporation, Syracuse, N. Y.
 Dallas Engineering Co., Inc., Dallas, Tex.
 Drying System, Inc., Chicago.
 Economy Electric Manufacturing Co., Cicero, Ill.
 Essick Manufacturing Co., Los Angeles.
 Farr Company, Los Angeles.
 Goettl Bros. Metal Products Co., Phoenix, Ariz.
 Great National Air Conditioning Corp., Dallas, Tex.
 International Sales Co., San Francisco.
 Montag Stove & Furnace Works, Portland, Ore.
 Mountain States Equipment Co., Denver, Colo.
 National Engineering & Manufacturing Co., Kansas City.
 • Palmer Manufacturing Corp., Phoenix, Ariz.
 Pernot & Rich, Inc., Los Angeles.
 Reynolds Manufacturing Co., Springfield, Mo.
 Royal Air Conditioning Equipment Co., Alhambra, Calif.
 Shreveport Eng. Co., Inc., Shreveport, La.
 • U. S. Air Conditioning Corp., Minneapolis.
 • Utility Fan Corporation, Los Angeles.
 Western Blower Co., Seattle, Wash.
 X L Refrigerating Co., Inc., Chicago.

AIR CONDITIONING UNITS, ROOM TYPE, SUMMER, FLOOR CABINET, REMOTE COMPRESSOR OR COLD WATER, UNDER 3 TONS CAPACITY

(Self-contained blower, coil, filter unit for connection to remote compressor or cold water supply)

American Coils, Inc., Newark, N. J.
 • Airtemp Division, Chrysler Corp., Dayton, O.
 Carrier Corp., Syracuse, N. Y.
 General Air Conditioning Corp., Cincinnati.
 General Electric Co., Bloomfield, N. J.
 Giant Mfg. Co., Council Bluffs, Ia.
 Hastings Air Conditioning Co., Inc., Hastings, Nebr.
 • Ilg Electric Ventilating Co., Chicago.
 Jaden Mfg. Co., Hastings, Nebr.
 Kauffman Air Conditioning Corp., St. Louis.
 Kennard Corporation, St. Louis.
 King Ventilating Co., Owatonna, Minn.
 McQuay, Inc., Minneapolis.
 Norwin Co., Freeport, Ill.
 Peerless of America, Inc., Marion, Ind.
 • Premier Furnace Co., Dowagiac, Mich.
 Refrigeration Appliances, Inc., Chicago.
 Refrigeration Economics Co., Inc., Canton, O.
 Scott-Newcomb, Inc., St. Louis.
 Standard Computing Scale Co., Air Conditioning & Refrigeration Div., Detroit.
 Trane Company, La Crosse, Wis.
 Unified Air Conditioner Co., Duluth, Minn.
 • Viking Mfg. Corp., Dayton, O.
 X L Refrigerating Co., Inc., Chicago.
 York Corp., York, Pa.
 Young Radiator Co., Racine, Wis.

AIR CONDITIONING UNITS, ROOM TYPE, SUMMER, FLOOR CABINET, SELF-CONTAINED COMPRESSOR, UNDER 3 H. P.

(Self-contained blower, coils, compressor and filter unit)

• Airtemp Div., Chrysler Corp., Dayton, O.
 Carrier Corp., Syracuse, N. Y.
 Frigidaire Div., General Motors Sales Corp., Dayton, O.
 General Electric Co., Bloomfield, N. J.
 Ice Cooling Appliance Corp., Morrison, Ill. (Ice)
 • Ilg Electric Ventilating Co., Chicago.
 Kauffman Air Conditioning Corp., St. Louis.
 Peerless of America, Inc., Marion, Ind.
 Philco Radio & Television Corp., Philadelphia.
 Pleasantaire Corp., Washington, D. C.
 • Premier Furnace Co., Dowagiac, Mich.
 Scott-Newcomb, Inc., St. Louis.
 York Corp., York, Pa.

AIR CONDITIONING UNITS, ROOM TYPE, WINTER, FLOOR CABINET

(Self-contained blower, filter, heating coil, humidifier unit)

Campbell Heating Co., Des Moines, Ia.
 Carrier Corp., Syracuse, N. Y.
 • Clarage Fan Company, Kalamazoo, Mich.
 Fitzgibbons Boiler Company, Inc., New York City.
 General Electric Co., Bloomfield, N. J.
 • Ilg Electric Ventilating Co., Chicago.
 Kauffman Air Conditioning Corp., St. Louis.
 Kehm Corporation, Chicago.
 Kennard Corporation, St. Louis.
 McQuay, Inc., Minneapolis.
 Peerless of America, Inc., Marion, Ind.
 Refrigeration Economics Co., Inc., Canton, O.
 Reznor Mfg. Co., Mercer, Pa.
 Richmond Radiator Co., New York City.
 Somers, Inc., H. J., Detroit.
 Standard Computing Scale Co., Air Conditioning and Refrigeration Div., Detroit.

• Surface Combustion, Toledo, O.
 Trane Co., La Crosse, Wis.
 Unified Air Conditioner Co., Duluth, Minn.
 • U. S. Air Conditioning Corp., Minneapolis.
 • Viking Manufacturing Corp., Dayton, O.
 York Corp., York, Pa.

AIR CONDITIONING UNITS, ROOM TYPE, YEAR AROUND, FLOOR CABINET

(Self-contained blower, cooling and heating coil, filter, humidifier unit for connection to remote compressor or cold water supply and steam or hot water)

• Airtemp Division, Chrysler Corp., Dayton, O.
 American Coils, Inc., Newark, N. J.
 Beacon-Morris Corp., Boston, Mass.
 Carrier Corp., Syracuse, N. Y.
 • Clarage Fan Co., Kalamazoo, Mich.
 Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis.
 General Electric Co., Bloomfield, N. J.
 General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
 Hastings Air Conditioning Co., Inc., Hastings, Nebr.
 • Ilg Electric Ventilating Co., Chicago.
 Jaden Manufacturing Co., Hastings, Nebr.
 Johnson Co., S. T., Oakland, Calif.
 Kauffman Air Conditioning Corp., St. Louis.
 Kelvinator Div., Nash-Kelvinator Corp., Detroit.
 Kennard Corporation, St. Louis.
 Kramer Trenton Co., Trenton, N. J.
 McQuay, Inc., Minneapolis, Minn.
 Mario Coil Co., St. Louis.
 Niagara Blower Co., New York City.
 Peerless of America, Inc., Marion, Ind.
 Pfening Co., Fred D., Columbus, O. (Industrial)
 Refrigeration Economics Co., Inc., Canton, O.
 Standard Computing Scale Co., Air Conditioning and Refrigeration Div., Detroit.
 Trane Co., La Crosse, Wis.
 Unified Air Conditioner Co., Duluth, Minn.
 York Corp., York, Pa.

AIR CONDITIONING UNITS, STORE TYPE, SUMMER, FLOOR CABINET, SELF-CONTAINED COMPRESSOR, 3 H. P. AND OVER

(Self-contained blower, coil, compressor, filter unit, with air discharge approximately 6 ft. above floor)

Air Conditioning & Refrigeration Div., Worthington Pump & Machinery Corp., Harrison, N. J.
 • Airtemp Div., Chrysler Corp., Dayton, O.
 Baker Ice Machine Co., Inc., Omaha, Nebr.
 Brunner Manufacturing Co., Utica, N. Y.
 Carrier Corp., Syracuse, N. Y.
 • Clarage Fan Company, Kalamazoo, Mich.
 Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis.
 Forman Air Conditioning & Eng. Co., New York City (Freon)
 Frick Co., Waynesboro, Pa.
 Frigidaire Div., General Motors Corp., Dayton, O.
 General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
 General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
 Governair Corporation, Oklahoma City, Okla.
 Kauffman Air Conditioning Corp., St. Louis.
 Kramer Trenton Co., Trenton, N. J.
 Nevinger Manufacturing Co., Inc., Greenville, Ill.
 Peerless of America, Inc., Marion, Ind.
 Refrigeration Appliances, Inc., Chicago.
 Scott-Newcomb, Inc., St. Louis, Mo.
 Trane Company, LaCrosse, Wis.
 • Viking Mfg. Co., Dayton, O.
 Vilter Mfg. Co., Milwaukee.
 Westinghouse Electric & Mfg. Co., Springfield, Mass.
 X L Refrigerating Co., Inc., Chicago.
 York Corp., York, Pa.

AIR DIFFUSERS

See Diffusers, Air

AIR FILTERS

See Filters, Air

AIR METERS

See Meters, Air Velocity, Direct Reading

AIR WASHERS

See Washers, Air

ANALYZERS, CO₂, PORTABLE

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
 Barclay, Inc., Robert, Chicago.
 Defender Instrument and Regulator Co., St. Louis.
 Dwyer Mfg. Co., F. W., Chicago.
 Elmer & Amend, New York City.
 Ellison Draft Gage Co., Chicago.
 Engelhard, Inc., Chas., Newark, N. J.
 General Scientific Equipment Co., Philadelphia.
 Hays Corp., Michigan City, Ind.

• Advertisement in this issue. See Index to Advertisers, page 324.

Huyette Co., Inc., Paul B., Philadelphia.
 Permutit Co., New York City.
 Precision Control Co., San Francisco.
 Precision Thermometer & Instrument Co., Philadelphia.
 Preferred Utilities Mfg. Corp., New York City.
 Service to Industry, West Hartford, Conn.
 Uehling Instrument Co., Paterson, N. J.
 Weaver Mfg. Co., Springfield, Ill.

ANEMOMETERS

- American Instrument Co., Silver Spring, Md.
- Barclay, Inc., Robert, Chicago.
- Detroit Air Conditioning Service Co., Inc., Detroit.
- Friez Instrument Div., Towson, Md.
- Hill, E. Vernon, Chicago.
- Illinois Testing Laboratories, Inc., Chicago.
- Taylor Instrument Companies, Rochester, N. Y.
- Willson Products, Inc., Reading, Pa. (Thermometer)

ANGLES, BARS, BEAMS, CHANNELS AND TEES (LIGHT WEIGHT SHAPES)

- Allegheny Ludlum Steel Corp., Brackenridge, Pa.
- Aluminum Co. of America, Pittsburgh.
- American Brass Co., Waterbury, Conn.
- American Sheet Metal Works, New Orleans, La.
- Atlantic Steel Co., Atlanta, Ga.
- Bethlehem Steel Co., Bethlehem, Pa.
- Brasco Manufacturing Co., Harvey, Ill.
- Byers Co., A. M., Pittsburgh, Pa. (Wrought iron structural shapes).
- Carnegie-Illinois Steel Corp., Pittsburgh.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Colonial Alloys Co., Philadelphia.
- Columbia Steel Co., San Francisco.
- Decatur Iron & Steel Co., Decatur, Ala.
- Dow Chemical Co., Midland, Mich.
- Inland Steel Co., Chicago.
- International Steel Co., Evansville, Ind.
- Jones & Laughlin Steel Corp., Pittsburgh.
- Laclede Steel Co., St. Louis.
- Lees Div., John, Serrick Corp., Muncie, Ind.
- Mesker & Co., Geo. L., Evansville, Ind.
- Milcor Steel Co., Milwaukee.
- Republic Steel Corp., Cleveland.
- Revere Copper & Brass, Inc., New York City.
- Sioux Steel Co., Sioux Falls, S. D.
- Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
- Truscon Steel Co., Youngstown, O.
- Weirton Steel Co., Weirton, W. Va.
- Werner Co., Inc., R. D., New York City.
- Youngstown Sheet & Tube Co., Youngstown, O.

ARC WELDERS

See Welders, Arc

ARC WELDING ELECTRODES

See Electrodes, Arc Welding

ASBESTOS BOARD

See Board, Duct, Asbestos

ASBESTOS PAPER

See Paper, Asbestos

ATTIC FANS

See Fans, Night Air Cooling

ATTIC FURNACES

See Furnaces, Warm Air, Air Conditioning for Attic Installation

AUTOMATIC HUMIDIFIERS

See Humidifiers, Furnaces, Evaporation, Spray

BAFFLES, OIL BURNER & STOKER

- Air Devices, Inc., New York City.
- Barclay, Inc., Robert, Chicago.
- Commonwealth Products Co., Philadelphia.
- Harvey, Inc., Sid, Valley Stream, N. Y.
- Jones Products Co., Ferndale, Mich.
- Laclede-Christy Clay Products Co., St. Louis.
- McLeod & Henry Co., Inc., Troy, N. Y.
- Monogram Combustion Chamber Co., Philadelphia.
- Munn & Steele, Inc., Newark, N. J. (Stoker)
- Peterson Co., B. A., Dowagiac, Mich.
- Quigley Co., Inc., New York City.

BALANCING EQUIPMENT FOR FANS

- Bear Mfg. Co., Rock Island, Ill.
- Gisholt Machine Co., Madison, Wis.

BALL BEARINGS

See Bearings, Ball

BAND SAWS

See Saws, Band, Sheet Metal Cutting

BAR FOLDERS

See Machines, Bar Folders

BARS

See Angles, Bars, Beams, Channels and Tees (Light Weight Shapes)

BASES AND PADS, VIBRATION ISOLATING

- Armstrong Cork Co., Lancaster, Pa. (Cork)
- Buffalo Forge Co., Buffalo.
- Clarage Fan Company, Kalamazoo, Mich.
- Cork Import Corp., New York City (Cork).
- Cork Insulation Co., Inc., New York City.
- Ehret Magnesia Manufacturing Co., Valley Forge, Pa.
- Felters Co., Boston.
- Firestone Tire & Rubber Co., Akron, O.
- Gates Rubber Co. Sales Div., Inc., Denver, Colo.
- Goodrich Co., B. F., Akron, Ohio.
- Johns-Manville, New York City.
- Keldur Corporation, New York City.
- Korfund Co., Inc., Long Island City, N. Y.
- Lord Mfg. Co., Erie, Pa.
- Mundet Cork Corp., Brooklyn, N. Y.
- National Lead Co., New York City.
- Remco Products Corp., York, Pa.
- United Cork Companies, Kearny, N. J.
- United States Rubber Co., New York City.
- Vibration Eliminator Co., Astoria, N. Y. (Cork and rubber)
- Vibration Control Co., New York City.
- Western Felt Works, Chicago (Felt)

BATHS, TINNING

- American Gas Furnace Co., Elizabeth, N. J.
- Eclipse Fuel Engineering Co., Rockford, Ill.
- Farrelloy Co., Inc., Philadelphia.
- Retinning Manufacturing Co., Chicago.

BEADERS

See Machines, Beading

BEAMS

See Angles, Bars, Beams, Channels and Tees (Light weight shapes)

BEARINGS, BALL

- Ahlberg Bearing Co., Chicago.
- Bantam Bearings Div., Torrington Co., South Bend, Ind.
- Bearing Co. of America, Lancaster, Pa.
- Burgess-Norton Mfg. Co., Geneva, Ill.
- Dodge Mfg. Corp., Mishawaka, Ind.
- Fafnir Bearing Co., New Britain, Conn.
- Link-Belt Co., Chicago.
- Marlin-Rockwell Corp., Jamestown, N. Y.
- New Departure Div., General Motors Corp., Bristol, Conn.
- Nice Ball Bearing Co., Philadelphia.
- Norma-Hoffmann Bearings Corp., Stamford, Conn.
- Schatz Mfg. Co., Poughkeepsie, N. Y.
- Shafer Bearing Corp., Chicago.
- SKF Industries, Inc., Philadelphia.
- Stephens-Adamson Mfg. Co., Aurora, Ill.
- Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, PILLOW BLOCK

- Ahlberg Bearing Co., Chicago.
- Air Controls, Inc., Cleveland.
- Caldwell Co., W. E., Louisville, Ky.
- Central Die Casting & Mfg. Co., Inc., Chicago.
- Chain Belt Co., Milwaukee.
- Chicago Die Casting Co., Chicago.
- Clisbe Bros. Mfg. Co., Plymouth, Ind.
- Dick Co., Inc., R. & J., Passaic, N. J.
- Dodge Mfg. Corp., Mishawaka, Ind.
- Fafnir Bearing Co., New Britain, Conn.
- Freed Products Co., Moline, Ill.
- General Motors Corp., Moraine Products Div., Dayton, O.
- Goldens' Fdry. & Machine Co., Columbus, Ga.
- Hastings Air Conditioning Co., Inc., Hastings, Nebr.
- Jones Foundry & Machine Co., W. A., Chicago.
- Lau Blower Co., Dayton, O.
- Link-Belt Co., Chicago.
- Medart Co., St. Louis.
- Norma-Hoffmann Bearing Corp., Stamford, Conn.
- Randall Graphite Products Corp., Chicago.
- Royersford Foundry & Machine Co., Royersford, Pa.
- Shafer Bearing Corp., Chicago.
- SKF Industries, Inc., Philadelphia.
- Sprout-Waldron & Co., Muncy, Pa.
- Standard Pressed Steel Co., Jenkintown, Pa.
- Stephens-Adamson Mfg. Co., Aurora, Ill.
- Triangle Manufacturing Co., Oshkosh, Wis.
- Viking Air Conditioning Corp., Cleveland.
- Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, ROLLER

- Ahlberg Bearing Co., Chicago.
- Bantam Bearings Div., Torrington Co., South Bend, Ind.
- Dodge Mfg. Corp., Mishawaka, Ind.
- Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
- Link-Belt Co., Chicago.
- Medart Co., St. Louis.
- Norma-Hoffmann Bearings Corp., Stamford, Conn.
- Roller Bearing Co. of America, Trenton, N. J.
- Royersford Foundry & Machine Co., Royersford, Pa.
- Shafer Bearing Corp., Chicago.
- SKF Industries, Inc., Philadelphia.

Timken Roller Bearing Co., Canton, O.
Torrington Co., Torrington, Conn. (Needle)
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, SLEEVE

Dodge Mfg. Corp., Mishawaka, Ind.
Federal-Mogul Corp., Detroit.
General Motors Corp., Moraine Products Div., Dayton, O.
Johnson Bronze Co., New Castle, Pa.
Keystone Carbon Co., Inc., St. Marys, Pa.
Medart Co., St. Louis.
Motex Metal Process Corporation, Detroit.
• Randall Graphite Products Co., Chicago.
Wood's Sons Co., T. B., Chambersburg, Pa.

BELTS, V

Allis-Chalmers Mfg. Co., Milwaukee.
American Pulley Co., Philadelphia.
Baldwin Belting, Inc., New York City.
Browning Mfg. Co., Inc., Maysville, Ky.
Chicago Belting Co., Chicago.
Continental Rubber Works, Erie, Pa.
Dayton Rubber Mfg. Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Manufacturing Corp., Mishawaka, Ind.
Firestone Tire & Rubber Co., Akron, O.
Gates Rubber Co., Denver, Colo.
Gilmer Co., L. H., Philadelphia, Pa.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Graton & Knight, Worcester, Mass. (Leather)
Jones Foundry & Machine Co., W. A., Chicago.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., Passaic, N. J.
Manheim Mfg. & Belting Co., Manheim, Pa. (Adjustable)
Medart Co., St. Louis.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Rockwood Manufacturing Co., Indianapolis.
Schlerson Co., Chas. A., New York City.
Thermold Rubber Div. of Thermold Co., Trenton, N. J.
United States Rubber Co., New York City.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

BENDERS, ANGLE, ETC.

Bath Company, Cyril, Cleveland.
Champion Blower & Forge Co., Lancaster, Pa.
Excelsior Tool & Machine Co., East St. Louis, Ill.
• Evans Machine Co., L. R., Sandwich, Ill.
Hendley & Whittemore Co., Beloit, Wis.
• Hossfeld Mfg. Co., Winona, Minn.
Martens & Stormoen, Boston 10.
O'Neill-Irwin Mfg. Co., Minneapolis.
Pedrick Tool & Machine Co., Philadelphia.
Thomas Machine Manufacturing Co., Pittsburgh.
• Whitney Metal Tool Co., Rockford, Ill.

BI-METALS, THERMOSTATIC

Chace Co., W. M., Detroit, Mich.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Wilson Co., The, H. A., Newark, N. J.

BLADES, PROPELLER FAN

Ackermann Manufacturing Co., Wheeling, W. Va.
Aerovent Fan Co., Piqua, O.
• Air Controls, Inc., Cleveland.
Alre-Folle Fan & Blower Co., Detroit.
Airmaster Corp., Chicago.
C & H Air Conditioning Fan Co., Inc., Atlanta, Ga.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Products, Inc., Irvington, N. J.
Circulators & Devices Mfg. Corp., New York City.
Dallas Engineering Co., Inc., Dallas, Tex.
DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Dual-Air Fan Corp., Chicago.
Dynamic Air Engineering, Inc., Los Angeles.
Economy Electric Manufacturing Co., Cicero, Ill.
Electrovent Fan & Mfg. Co., Chicago.
Goettl Bros., Phoenix, Ariz.
International Engineering, Inc., Dayton, O.
La-Del Conveyor & Mfg. Co., New Philadelphia, O.
Martin Fan & Blower Co., Chicago.
Meier Electric & Machine Co., Indianapolis, Ind.
Myers Electric Co., Pittsburgh.
Norwin Co., Freeport, Ill.
• Peerless Electric Co., Warren, O.
Propellair, Inc., Springfield, O.
Roto-Beam Div., Peerless of America, Chicago.
• Schwitzer-Cummins Co., Indianapolis.
South Bend Air Products, Inc., South Bend, Ind.
• Sturtevant Co., B. F., Hyde Park, Boston.
Thermal Industries, Indio, Calif.
Torrington Mfg. Co., Torrington, Conn.
• Utility Appliance Corporation, Los Angeles.
Victor Electric Products, Inc., Cincinnati.

BLAST GATES

Allington & Curtis Mfg. Co., Saginaw, Mich.
• Berger Bros. Co., Philadelphia.
Blower Application Co., Milwaukee.
Buffalo Forge Co., Buffalo.
Champion Blower & Forge Co., Lancaster, Pa.
• Clarage Fan Co., Kalamazoo, Mich.
Day Co., The, Minneapolis.
Goethel Sheet Metal Works, Alfred, Milwaukee.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
Kirk & Blum Mfg. Co., Cincinnati.
Maysteel Products, Inc., Mayville, Wis.
National Metal Fabricators, Chicago.
Puhl & Hepper Mfg. Co., Inc., St. Louis.
R-S Products Corp., Philadelphia.
Spencer Turbine Co., Hartford, Conn.
• Sturtevant Co., B. F., Hyde Park, Boston.
Western Blower Co., Seattle, Wash.
Winkler & Sons, Inc., A. E., Milwaukee.

BLOWER—FILTER UNITS

(Separate Conversion Units for Warm Air Furnaces)

Agricola Furnace Co., Inc., Gadsden, Ala.
Air Conditioning Equipment Co., Minneapolis.
• Air Control Products, Inc., Coopersville, Mich.
• Air Controls, Inc., Cleveland.
Airwasher Corporation, Lansing, Mich.
Aladdin Heating Corporation, Oakland, Calif.
American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis.
American Furnace & Foundry Co., Milan, Mich.
American Machine Products Co., Marshalltown, Ia.
American Radiator & Standard Sanitary Corp., Pittsburgh.
Ames Co., W. R., San Francisco.
Arcweld Manufacturing Co., Inc., Seattle, Wash.
Armstrong Furnace Co., Columbus, O.
Auburn Burner Co., Auburn, Ind.
Bard Mfg. Co., Bryan, O.
Barrett Engineers, Cleveland Heights, O.
Bishop & Babcock Mfg. Co., Cleveland.
Bovee Furnace Works, Waterloo, Ia.
• Brundage Co., Kalamazoo, Mich.
Bryant Corp., C. L., Cleveland.
Campbell Heating Co., Des Moines, Ia.
• Char-Gale Mfg. Co., Minneapolis.
• Cleveland Steel Products Corp., Torridheat Div., Cleveland.
• Conco Corporation, Mendota, Ill.
• Dowagiac Steel Furnace Co., Dowagiac, Mich.
Economy Electric Mfg. Co., Cicero, Ill.
• Forest City Foundries Co., Cleveland.
• Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis.
Furblo Co., Hermansville, Mich.
Gehrl Co., Tacoma, Wash.
Green Colonial Furnace Co., Des Moines, Ia.
• Hall-Neal Furnace Co., Indianapolis.
Harvey-Whipple, Inc., Springfield, Mass.
Hastings Air Conditioning Co., Inc., Hastings, Nebr.
• Henry Furnace Co., Medina, Ohio.
Hess Warming & Ventilating Co., Chicago.
• Homer Furnace & Foundry Corp., Coldwater, Mich.
International Sales Co., San Francisco.
• Jackson & Church Co., Saginaw, Mich.
Jaden Mfg. Co., Inc., F., Hastings, Nebr.
Kelsey Heating Co., Syracuse, N. Y.
Kortz Blower Mfg. Co., Grand Rapids, Mich.
• Lau Blower Co., Dayton, O.
Lennox Furnace Co., Marshalltown, Ia.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
• Majestic Co., Huntington, Ind.
Marshall Furnace Co., Marshall, Mich.
Martin Fan & Blower Co., Chicago.
• Meyer Furnace Co., Peoria, Ill.
Montag Stove & Furnace Works, Portland, Ore.
• Mueller Furnace Co., L. J., Milwaukee.
National Manufacturing & Engineering Co., Detroit.
New-Aire Blower Co., Dearborn, Mich.
Northwest Stove & Furnace Works, Inc., Portland, Ore.
• Olsen Mfg. Co., C. A., Elyria, O.
• Palmer Manufacturing Corp., Phoenix, Ariz.
Patten Co., J. V., Sycamore, Ill.
• Payne Furnace & Supply Co., Beverly Hills, Calif.
• Peerless Electric Co., Warren, O.
• Peerless Foundry Co., Indianapolis.
Pennsylvania Furnace & Iron Co., Warren, Pa.
• Premier Furnace Co., Dowagiac, Mich.
• Round Oak Co., Dowagiac, Mich.
Royal Air Conditioning Equip. Co., Alhambra, Calif.
• Rudy Furnace Co., Dowagiac, Mich.
• Rybolt Heater Co., Ashland, O.
Ryniker Steel Products Co., Billings, Mont.
St. Louis Furnace Mfg. Co., St. Louis.
Sandberg Co., H. J., Portland, Ore.
• Schwab Furnace Co., Milwaukee.
Security Manufacturing Co., Kansas City, Mo.
Skinner Htg. & Vent. Co., Heater Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis.
• U. S. Air Conditioning Corp., Minneapolis.
• Utility Appliance Corporation, Los Angeles.

• Advertisement in this issue. See Index to Advertisers, page 324.

- Viking Air Conditioning Corp., Cleveland.
- Waterman-Waterbury Co., Minneapolis.
- Wayne Automatic Relay Co., Fort Wayne, Ind.
- Western Blower Co., Seattle, Wash.
- Williamson Heater Co., Cincinnati.

BLOWER HOUSINGS

See Housings, Blower

BLOWER-WASHER UNITS, FOR CLEANING OR HUMIDIFYING

(Separate Conversion Units for Warm Air Furnaces)

- Air Stream Filter Corp., St. Louis.
- Airwasher Corporation, Lansing, Mich.
- American Blower Corporation, Detroit.
- American Machine Products Co., Marshalltown, Ia.
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Bishop & Babcock Mfg. Co., Cleveland.
- Brauer Supply Co., A. G., St. Louis.
- Hess Warming & Ventilating Co., Chicago.
- International Sales Co., San Francisco.
- MaGiri Foundry & Furnace Works, P. H., Bloomington, Ill.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- National Engineering & Manufacturing Co., Kansas City.
- New York Blower Co., Chicago.
- Parker Heating & Manufacturing Co., St. Petersburg, Fla.

BLOWER WHEELS

See Wheels, Blower

BLOWERS, FORCED DRAFT, FOR ASH PIT

- American Blower Corp., Detroit.
- American Foundry & Furnace Co., Bloomington, Ill.
- Barrett Engineers, Cleveland Heights, O.
- Buffalo Forge Co., Buffalo.
- Burnwell Corp., Allentown, Pa.
- Champion Blower & Forge Co., Lancaster, Pa.
- Clarage Fan Co., Kalamazoo, Mich.
- Economy Electric Mfg. Co., Cicero, Ill.
- Fuel Savers, Inc., Harrisburg, Pa.
- Garden City Fan Co., Chicago.
- General Blower Co., Chicago.
- General Blower Co., Inc., Philadelphia.
- International Engineering, Inc., Dayton, O.
- Kortz Blower Mfg. Co., Grand Rapids, Mich.
- Lehigh Fan & Blower Co., Allentown, Pa.
- Martin Fan & Blower Co., Chicago.
- Mohler Co., J. K., Ephrata, Pa.
- New York Blower Co., Chicago.
- South Bend Air Products, Inc., South Bend, Ind.
- Sturtevant Co., B. F., Hyde Park, Boston.
- Universal Blower Co., Birmingham, Mich.
- Wing Mfg. Co., L. J., New York City.

BLOWERS, FORCED DRAFT, FOR SMOKE PIPE

- American Foundry & Furnace Co., Bloomington, Ill.
- Barrett Engineers, Cleveland Heights, O.
- Garden City Fan Co., Chicago.
- General Blower Co., Chicago.
- Kortz Blower Mfg. Co., Grand Rapids, Mich.
- Martin Fan & Blower Co., Chicago.
- Muncie Gear Works, Muncie, Ind.
- New York Blower Co., Chicago.

BLOWERS, FURNACE CENTRIFUGAL

- Agricola Furnace Co., Inc., Gadsden, Ala.
- Air Conditioning Equipment Co., Minneapolis.
- Air Control Products, Inc., Coopersville, Mich.
- Air Controls, Inc., Cleveland.
- Alrecon Industries, Incorporated, Detroit.
- Aladdin Heating Corporation, Oakland, Calif.
- American Blower Corp., Detroit.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace Co., St. Louis, Mo.
- American Machine Products Co., Marshalltown, Ia.
- Ames Co., W. R., San Francisco.
- Auburn Burner Co., Auburn, Ind.
- Barrett Engineers, Cleveland Heights, O.
- Bishop & Babcock Mfg. Co., Cleveland.
- Brundage Co., Kalamazoo, Mich.
- Buffalo Forge Co., Buffalo.
- Campbell Heating Co., Des Moines, Ia.
- Champion Blower & Forge Co., Lancaster, Pa.
- Chandler Co., Cedar Rapids, Ia.
- Clarage Fan Co., Kalamazoo, Mich.
- Economy Electric Mfg. Co., Cicero, Ill.
- Freed Products Co., Moline, Ill.
- Furblo Co., Hermansville, Mich.
- Gehrl Co., Tacoma, Wash.
- General Blower Co., Chicago.
- General Blower Co., Inc., Philadelphia.
- Goettl Bros., Phoenix, Ariz.
- Grand Rapids Die & Tool Co., Grand Rapids, Mich.
- Hastings Air Conditioning Co., Inc., Hastings, Nebr.
- Hess Warming & Ventilating Co., Chicago.
- International Sales Co., San Francisco.
- Jaden Mfg. Co., Hastings, Nebr.

- Kortz Blower Mfg. Co., Grand Rapids, Mich.
- Lau Blower Co., Dayton, O.
- Lennox Furnace Co., Marshalltown, Iowa.
- Majestic Co., Huntington, Ind.
- Mauer Engineering, Evanston, Ill.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- Morrison Products, Inc., Cleveland.
- Mountain States Equipment Company, Denver, Colo.
- Mueller Furnace Co., L. J., Milwaukee.
- National Manufacturing & Engineering Co., Detroit.
- New-Alre Blower Co., Dearborn, Mich.
- New York Blower Co., Chicago.
- Northern Furnace & Supply Company, Billings, Mont.
- Palmer Manufacturing Corp., Phoenix, Ariz.
- Parker Heating & Manufacturing Co., St. Petersburg, Fla.
- Peerless Electric Co., Warren, O.
- Premier Furnace Co., Dowagiac, Mich.
- Reynolds Mfg. Co., Grand Rapids, Mich.
- Royal Air Conditioning Equip. Co., Alhambra, Calif.
- Rudy Furnace Co., Dowagiac, Mich.
- Ryniker Steel Products Company, Billings, Mont.
- Security Manufacturing Co., Kansas City, Mo.
- Schwitzer-Cummins Co., Indianapolis.
- Skinner Htg. & Vent. Co., Heater Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis.
- Skuttie Manufacturing Co., Detroit.
- Smith Manufacturing Co., Inc., F. A., Rochester, N. Y.
- Sturtevant Co., B. F., Hyde Park, Boston.
- U. S. Air Conditioning Corp., Minneapolis.
- Utility Appliance Corporation, Los Angeles.
- Viking Air Conditioning Corp., Cleveland.
- Waterman-Waterbury Co., Minneapolis.
- Western Blower Co., Seattle, Wash.

BLOWERS, VENTILATING SYSTEM

(Capacity 4,000 c.f.m. up)

- Advance Fan & Blower Co., Detroit.
- Air Controls, Inc., Cleveland.
- Aladdin Heating Corporation, Oakland, Calif.
- Allington & Curtis Mfg. Co., Saginaw, Mich.
- American Blower Corp., Detroit.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Machine Products Company, Marshalltown, Ia.
- Ames Co., W. R., San Francisco.
- Ballantyne Co., Omaha, Nebr.
- Bayley Blower Co., Milwaukee.
- Beckett & Co., Thomas, Dallas, Tex.
- Bishop & Babcock Mfg. Co., Cleveland.
- Brundage Co., Kalamazoo, Mich.
- Buffalo Forge Co., Buffalo.
- Campbell Heating Co., E. K., Kansas City, Mo.
- Champion Blower & Forge Co., Lancaster, Pa.
- Clarage Fan Co., Kalamazoo, Mich.
- Coppus Engineering Corp., Worcester, Mass.
- De Bothezat Fans Division, American Machine & Metals, Inc., East Moline, Ill.
- Economy Electric Manufacturing Co., Cicero, Ill.
- Electrovent Fan & Mfg. Co., Chicago.
- Furblo Co., Hermansville, Mich.
- Garden City Fan Co., Chicago.
- General Blower Co., Chicago.
- General Blower Co., Inc., Philadelphia.
- Grand Rapids Die & Tool Co., Grand Rapids, Mich.
- Hastings Air Conditioning Company, Inc., Hastings, Nebr.
- Ilg Electric Ventilating Co., Chicago.
- International Engineering, Inc., Dayton, O.
- International Sales Co., San Francisco.
- Jaden Mfg. Co., Inc., F., Hastings, Nebr.
- Johnson Fan & Blower Corp., Chicago.
- King Ventilating Co., Owatonna, Minn.
- Kortz Blower Mfg. Co., Grand Rapids, Mich.
- La-Del Conveyor & Mfg. Co., New Philadelphia, Ohio.
- Lau Blower Co., Dayton, O.
- Lehigh Fan & Blower Co., Allentown, Pa.
- MaGiri Foundry & Furnace Works, P. H., Bloomington, Ill.
- Martin Fan & Blower Co., Chicago.
- Montag Stove & Furnace Works, Portland, Ore.
- Mountain States Equipment Co., Denver, Colo.
- National Engineering & Manufacturing Co., Kansas City.
- National Manufacturing & Engineering Co., Detroit.
- Nelson Corporation, Herman, Moline, Ill.
- New York Blower Co., Chicago.
- Niagara Blower Co., New York City.
- Northern Blower Co., Cleveland.
- Parker Heating & Manufacturing Co., St. Petersburg, Fla.
- Peerless Electric Co., Warren, O.
- Phelps Mfg. Co., Little Rock, Ark.
- Reynolds Manufacturing Co., Grand Rapids, Mich.
- Royal Air Conditioning Equip. Co., Alhambra, Calif.
- Schwitzer-Cummins Co., Indianapolis.
- Skinner Heating & Vent. Co., Heater Div. of St. Louis Blow Pipe & Heater Co., St. Louis.
- Sturtevant Co., B. F., Hyde Park, Boston.
- Torit Manufacturing Co., St. Paul, Minn.
- Trane Company, LaCrosse, Wis.
- U. S. Air Conditioning Corp., Minneapolis.
- Utility Appliance Corporation, Los Angeles.

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- Viking Air Conditioning Corp., Cleveland.
- Western Blower Co., Seattle, Wash.
- Wing Mfg. Co., L. J., New York City.

BLOW PIPE EQUIPMENT

See Blast Gates; Collectors, Blow Pipe; Fittings, Blow Pipe

BOARD, SUBSTITUTE MATERIAL, FOR DUCTS

- Carey Mfg. Co., Phillip, Lockland, Cincinnati, Ohio.
- Celotex Corporation, Chicago.
- Johns-Manville, New York City.
- Keasbey & Mattison Company, Ambler, Pa.
- Keystone Asphalt Products Co., Chicago.
- Masonite Corporation, Chicago.
- Ruberoid Co., New York City.
- Sall Mountain Co., Chicago.
- United States Gypsum Company, Chicago.
- Wilson, Inc., Grant, Chicago.

BOLTS, EXPANSION

- Chase Brass & Copper Co. Incorporated, Waterbury, Conn.
- Chicago Expansion Bolt Co., Chicago.
- Diamond Expansion Bolt Co., Inc., Garwood, N. J.
- Fee & Mason Mfg. Co., Inc., New York City.
- National Lead Co., New York City.
- Paine Company, The, Chicago.
- Rawplug Company, Inc., New York City.
- Rolyan Corp., Chicago.
- Star Expansion Bolt Co., New York City.
- U. S. Expansion Bolt Co., Inc., York, Pa.

BOLTS, TOGGLE AND ANCHOR

- Carpenter & Paterson, Inc., East Boston, Mass.
- Carty & Moore Engineering Co., Detroit (Anchor).
- Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
- Chicago Expansion Bolt Co., Chicago.
- Crawford Co., Chicago.
- Diamond Expansion Bolt Co., Inc., Garwood, N. J.
- Fee & Mason Mfg. Co., Inc., New York City.
- Grabler Mfg. Co., Cleveland.
- Paine Company, The, Chicago.
- Rawplug Company, Inc., New York City.
- Star Expansion Bolt Co., New York City.
- U. S. Expansion Bolt Co., Inc., York, Pa.

BOOSTER FANS

See Fans, Booster

BOOTS, FURNACE PIPE

See Fittings and Accessories, Furnace Pipe

BRAKES, METAL WORKERS', HAND

- Dreis & Krump Mfg. Co., Chicago.
- Elker Mfg. Co., Ogallala, Nebr.
- Excelsior Tool and Machine Co., East St. Louis, Ill.
- New Albany Machine Mfg. Co., New Albany, Ind.
- Niagara Machine & Tool Works, Buffalo.
- O'Neill-Irwin Mfg. Co., Minneapolis.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Weiss & Co., H., New York City.
- Whitney Metal Tool Co., Rockford, Ill.

BRAKES, METAL WORKERS', PORTABLE

- Dreis & Krump Mfg. Co., Chicago.
- Elker Mfg. Co., Ogallala, Nebr.
- Harris, A. R., Hammond, Ind.
- O'Neill-Irwin Mfg. Co., Minneapolis.
- Whitney Metal Tool Co., Rockford, Ill.

BRAKES, METAL WORKERS', POWER

- Bath Company, Cyril, Cleveland.
- Cincinnati Shaper Co., Cincinnati.
- Dreis & Krump Mfg. Co., Chicago.
- Heartley Machine & Tool Co., Toledo, O.
- Ohl & Co., Geo. A., Newark, N. J.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Rafter Machine Co., Belleville, N. J.
- Swaine Mfg. Co., Fred J., St. Louis.
- Verson Allsteel Press Co., Chicago.
- Weiss & Co., H., New York City.
- Whitney Metal Tool Co., Rockford, Ill.

BRUSHES, ACID

- Eastern States Supply Co., Brooklyn, N. Y.
- Lukens Metal Co., Thos. F., Philadelphia.
- Milwaukee Brush Mfg. Co., Milwaukee.
- Osborn Mfg. Co., Cleveland.
- Potomac Mfg. Co., Philadelphia.
- Schaefer Brush Mfg. Co., Milwaukee (Rustproof).
- Weiss & Co., H., New York City.

BRUSHES, FURNACE

- Mill-Rose Co., Cleveland.
- Milwaukee Brush Mfg. Co., Milwaukee.
- Osborn Mfg. Co., Cleveland.

- Pilley Brush Co., Fort Madison, Iowa.
- Schaefer Brush Mfg. Co., Milwaukee.
- Worcester Brush & Scraper Co., Worcester, Mass.

BUFFERS, GRINDERS, POLISHERS AND SANDERS, ELECTRIC

- Albertson & Co., Inc., Sioux City, Iowa.
- Baldor Electric Co., St. Louis.
- Black & Decker Mfg. Co., Towson, Md.
- Brown-Brockmeyer Co., Inc., Dayton, O.
- Buckeye Portable Tool Co., Dayton, O.
- Champion Blower & Forge Co., Lancaster, Pa.
- Chicago Pneumatic Tool Co., New York City.
- Cincinnati Electric Tool Co., Cincinnati (with dust collector).
- Clark Jr. Electric Co., Jas., Louisville, Ky.
- Continental Machines Incorporated, Minneapolis.
- Detroit Surfacing Machine Co., Detroit.
- Diehl Mfg. Co., Somerville, N. J.
- Hammond Machinery Builders, Kalamazoo, Mich.
- Haskins Co., R. G., Chicago.
- Hobart Brothers Company, Troy, O.
- Independent Pneumatic Tool Co., Chicago.
- Jefferson Machine Tool Co., Cincinnati.
- Keller Tool Company, Grand Haven, Mich. (Pneumatic)
- Lee Co., K. O., Aberdeen, S. D.
- Mall Tool Co., Chicago.
- Millers Falls Co., Greenfield, Mass.
- Minnesota Mining & Manufacturing Co., St. Paul, Minn.
- Misener Mfg. Co., Inc., Syracuse, N. Y.
- Reynolds Electric Company, Chicago.
- Skilsaw, Inc., Chicago.
- Snap-On Tools Corp., Kenosha, Wis.
- Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.
- Stow Mfg. Co., Binghamton, N. Y.
- Syntron Co., Homer City, Pa.
- United States Electrical Tool Co., Cincinnati.
- U. S. Electrical Motors, Inc., Los Angeles.
- Van Dorn Electric Tool Co., Towson, Md.
- Wodack Electric Tool Corp., Chicago.
- York Electric and Machine Company, York, Pa.

BURNERS, GAS, CONVERSION, RESIDENTIAL

- Auburn Burner Co., Auburn, Ind.
- Autogas Company, Chicago.
- Barber Gas Burner Co., Cleveland.
- Bard Manufacturing Company, Bryan, Ohio.
- Beck Engineering Combustion Kompany, St. Louis.
- Bryan Steam Corp., Peru, Ind.
- Bryant Corp., C. L., Cleveland.
- Bryant Heater Co., Cleveland.
- Burdett Mfg. Co., Chicago.
- Cleveland Steel Products Corp., Torridheat Div., Cleveland.
- Columbia Burner Co., Toledo.
- Dalzen Tool & Manufacturing Co., Detroit.
- Franklin Gas Heating Co., Cincinnati.
- Handley Brown Heater Co., Jackson, Mich.
- Jackson Sheet Metal Works, Ogden, Utah.
- Johnson Gas Appliance Co., Cedar Rapids, Iowa.
- Kais Sunrise Works, Detroit.
- Leahy Mfg. Co., Los Angeles.
- Martin, J. O. & C. U., San Francisco.
- Moncrief Furnace & Mfg. Co., Inc., Dallas, Tex.
- National Machine Works, Chicago.
- Gas Burner Div., Mid-Continent Metal Products Co., Chicago
- Roberts-Gordon Appliance Corp., Buffalo.
- Rotary Mfg. Co., Los Angeles.
- Security Manufacturing Co., Kansas City, Mo.
- Sonner Burner Co., Winfield, Kans.
- Standard Heating & Radiator Co., Pittsburgh.
- Surface Combustion, Toledo, O.
- Webster Engineering Co., Tulsa, Okla.
- Zinc Co., John, Tulsa, Okla.

BURNERS, OIL, CONVERSION, RESIDENTIAL

- Acme Oil Burner Company, Inc., Cedar Rapids, Ia. (Gun).
- Airtemp Division, Chrysler Corp., Dayton, O.
- Aldrich Co., Wyoming, Ill.
- American Radiator & Standard Sanitary Corp., Pittsburgh. (Gun).
- Anchor Post Fence Co., Heating Div., Baltimore (Gun & Rotary).
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Auburn Burner Co., Auburn, Ind. (Gun and rotary).
- Auto-Heat Corp., New York City (Gun).
- Automatic Burner Corp., Chicago (Gun and rotary).
- Badger Mfg. Co., Madison, Wis. (Gun).
- Bard Manufacturing Company, Bryan, Ohio.
- Beckett Engineering Co., R. W., Elyria, Ohio (Gun).
- Bethlehem Foundry & Machine Co., Bethlehem, Pa. (Gun).
- Bovee Furnace Works, Waterloo, Ia. (Gun).
- Brigham Oil Burner Co., St. Louis (Gravity).
- Bryan Steam Corp., Peru, Ind. (Rotary and gun).
- Caloroll Burner Corp., Hartford, Conn. (Atmospheric, gun, horizontal rotary, vacuum pressure, wall flame).
- Campbell Machine Co., Minneapolis.
- Cary Mfg. Co., Waupaca, Wis. (Gravity).
- Century Engineering Corp., Cedar Rapids, Ia. (Gun).

• Advertisement in this issue. See Index to Advertisers, page 324.

- Chalmers Oil Burner Co., Minneapolis (Gun and rotary).
- Chandler Company, Cedar Rapids, Iowa (Gun and gravity).
- Chicago Steel Furnace Co., Chicago.
- Cleveland Steel Products Corp., Torridheat Div., Cleveland.
- Conco Corp., H. D. Conkey & Co., Mendota, Ill.
- Crane Company, Chicago (Gun).
- Delco Appliance Div., General Motors Corp., Rochester, N. Y. (Gun).
- D'Elia Oil Burner Co., Inc., Bridgeport, Conn. (Gun).
- Dowagiac Steel Furnace Company, Dowagiac, Mich.
- Eastern Oil & Equipment Co., Portland, Me. (Gun).
- Electrol Mfg. Co., Passaic, N. J. (Gun).
- Fairfield Oil Heating Co., Inc., Greenwich, Conn. (Gun).
- Fargo Foundry Co., Fargo, N. D. (Gun).
- Florence Stove Co., Gardner, Mass. (Gravity).
- General Electric Co., Bloomfield, N. J. (Gun).
- General Oil Heating Corp., West New York, N. J. (Gun).
- Gilbert & Barker Mfg. Co., West Springfield, Mass. (Gun).
- Gold Star Oil Burner Mfg. Co., Inc., Yonkers, N. Y. (Gun).
- Green Colonial Furnace Company, Des Moines, Iowa (Gun).
- Hall-Neal Furnace Co., Indianapolis. (Gun).
- Hardinge Oil Burner & Mfg. Co., Chicago (Gun and rotary).
- Hart Oil Burner Div., Avery Farm Machinery Co., Peoria, Ill. (Gun).
- Harvey-Whipple, Inc., Springfield, Mass. (Gun).
- Heatseal Burner Co., Omaha, Nebr. (Gun).
- Hell Co., Milwaukee (Gun).
- Herco Oil Burner Corp., Lancaster, Pa. (Gun).
- Hess Warming and Ventilating Co., Chicago.
- Hipoint Corp., Bellefontaine, O.
- Holtum Mfg. Co., Freeport, Ill. (Gun).
- Homer Furnace & Foundry Corp., Coldwater, Mich. (Gun).
- Hotentot Co., Inc., Omaha, Nebr. (Gun).
- Hubbard Co., Minneapolis (Gun).
- Hueller Mfg. Co., Inc., H. J., Brooklyn (Gun).
- Iowa Foundry Co., Sioux City, Ia.
- Jackson & Church Co., Saginaw, Mich.
- Jackson Oil Burner Co., Detroit (Vertical Gun).
- Johnson Co., S. T., Oakland, Calif., and Philadelphia (Gun).
- Kals Sunrise Works, Detroit (Gravity, Rotary, Gun).
- Kaybar Burner Corp., Chicago.
- Keith Furnace Co., Des Moines, Ia. (Gun).
- Kleen Heat, Inc., Chicago (Gun, Gravity, Rotary).
- Korth Oil Burner Corp., Roselle Park, N. J. (Rotary and gun).
- Kresky Mfg. Co., Petaluma, Calif. (Gravity).
- Laco Oil Burner Co., Griswold, Ia. (Gun and Gravity).
- Leahy Mfg. Co., Los Angeles.
- Leeson Air Conditioning Corporation, Detroit (Gun).
- Lennox Furnace Co., Marshalltown, Iowa (Gun—Pressure Atomizing).
- Little Burner Co., Inc., H. C., San Rafael, Calif. (Gravity).
- Majestic Co., Huntington, Ind. (Gun).
- Malleable Iron Fittings Co., Branford, Conn. (Gun).
- May Oil Burner Corp., Baltimore (Gun).
- Mayflower Oil Burner Corp., West New York, N. J. (Gun).
- McIlvaine Products, Inc., Philadelphia (continuous variable flame).
- Meyer Furnace Co., Peoria, Ill. (Gun).
- Miller Co., Meridian, Conn.
- Montag Stove & Furnace Works, Portland, Ore. (Gun).
- Mueller Furnace Co., L. J., Milwaukee (Gun, Gravity).
- National Alroil Burner Co., Philadelphia (Gun).
- Nu-Way Corp., Rock Island, Ill. (Gun).
- Oil Devices, Chicago (Pot Type).
- Pan-American Engineering Company, Berkeley, Calif. (Gun, rotary and turbine).
- Paragon Oil Burner Corp., Brooklyn.
- Peerless Oil Burner Co., Inc., Kansas City, Mo. (Gravity).
- Penn Boiler & Burner Mfg. Corp., Lancaster, Pa. (Gun).
- Petroleum Heat & Power Co., Stamford, Conn. (Gun).
- Preferred Utilities Manufacturing Corp., New York City.
- Quaker Mfg. Co., Chicago (Vaporizing Bowl).
- Quick Furnace & Supply Co., Des Moines, Ia.
- Quiet-Heat Mfg. Corp., Newark, N. J. (Gun).
- Quincy Stove Mfg. Co., Quincy, Ill. (Gravity).
- Ray Oil Burner Co., San Francisco (Gun, gravity and rotary).
- Reif-Rexoll, Inc., Buffalo.
- Rotary Mfg. Co., Los Angeles (Rotary).
- Round Oak Co., Dowagiac, Mich. (Gun).
- Rudy Furnace Co., Dowagiac, Mich. (Gun).
- Rybolt Heater Company, Ashland, Ohio (Gun).
- Sanmyer Corporation, Chicago (Gun).
- Sandberg Co., H. J., Portland, Ore.
- Scott-Newcomb, Inc., St. Louis (Gun).
- Sentry Mfg. Co., Omaha, Nebr. (Gun).
- Shedlov Oil Burners, Inc., Minneapolis (Gravity, gun).
- Silent Glow Oil Burner Corp., Hartford, Conn. (Gun and rotary).
- Simplex Oil Heating Corp., West Orange, N. J. (Gun, Rotary, Turbine).
- Sundstrand Engineering Co., Rockford, Ill. (Gun).
- Synco-Flame Burner Corp., Brockton, Mass. (Gun, rotary).
- Timken Silent Automatic Div., Timken-Detroit Axle Co., Detroit (Gun and rotary).
- Todd Shipyards Corporation (Comb. Eq. Div.), New York City.
- United States Burner Corp., Wethersfield, Conn. (Gun).
- Universal Manufacturers, Inc., Midland Park, N. J.
- Valley Mfg. Co., Athol, Mass. (Gun and rotary).
- Victor Oil Burner Mfg. Co., Hartford, Conn. (Gravity).
- Volcano Burner Corp., New York City (Gun).
- Vortex Mfg. Co., Portland, Ore.

- Waterman-Waterbury Co., Minneapolis (Gun).
- Wayne Oil Burner Co., Fort Wayne, Ind. (Gun and gravity).
- Weatherall Engineers, Inc., Providence, R. I. (Gun).
- Westwick & Son, Inc., John, Galena, Ill. (Gun).
- Williams Oil-O-Matic Heating Corp., Bloomington, Ill. (Gun).
- Wood Industries, Inc., Gar, Detroit (Gun).
- Woolery Machine Co., Minneapolis (Gun).
- York Electric and Machine Company, York, Pa.
- York-Heat Div., York-Shipley, Inc., York, Pa. (Gun).
- York Corp., York Pa. (Gun).

BURRING MACHINES

See Machines, Burring

CABINETS AND CASINGS

- Acme Tin Plate & Roofing Supply Co., Philadelphia.
- Airwasher Corporation, Lansing, Mich.
- Armstrong Furnace Company, Columbus, Ohio.
- Berger Mfg. Co., Div. of Republic Steel Corp., Canton, O.
- Biersach & Niedermeyer Company, Milwaukee.
- Brundage Co., Kalamazoo, Mich.
- Char-Gale Mfg. Co., Minneapolis.
- Chicago Metal Mfg. Co., Chicago.
- Dahlstrom Metallic Door Co., Jamestown, N. Y.
- Falstrom Co., Passaic, N. J.
- General Metal Products Co., St. Louis.
- Hauserman Co., E. F., Cleveland.
- Kirk & Blum Mfg. Co., Cincinnati, O.
- Lau Blower Co., Dayton, O.
- Lennox Furnace Co., Marshalltown, Ia.
- Lindsay and Lindsay, Chicago.
- Maysteel Products, Inc., Mayville, Wis.
- Mitchell Air Conditioning Co., Inc., Schenectady, N. Y.
- Mullins Mfg. Corp., Warren, Ohio.
- National Manufacturing & Engineering Co., Detroit.
- Northwest Stove & Furnace Works, Inc., Portland, Ore.
- Reliable Sheet Metal Engineering Co., Chicago (Metal).
- Rlester & Thesmacher Co., Cleveland.
- St. Charles Mfg. Co., St. Charles, Ill.
- Skinner Heating & Vent. Co., Heater Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis.
- Standard Pressed Steel Co., Jenkintown, Pa.
- Steinhorst & Sons, Inc., Emil, Utica, N. Y.
- Utica Products, Incorporated, Utica, N. Y.
- Waterman-Waterbury Company, Minneapolis.

CAPS AND TOPS, CHIMNEY

- Accurate Mfg. Works, Chicago.
- Acme Tin Plate & Roofing Supply Co., Philadelphia.
- Adams Company, The, Dubuque, Iowa.
- Ames Co., W. R., San Francisco.
- Edwards Mfg. Co., Inc., Cincinnati.
- Excelsior Steel Furnace Co., Chicago.
- Hirschman Co., Inc., W. F., Buffalo.
- Iwan Brothers, South Bend, Ind.
- Juniper Elbow Company, Inc., Middle Village, L. I., N. Y. (Shanty and Revolving Caps).
- Lamb & Ritchie Co., Cambridge, Mass.
- Little Burner Co., Inc., H. C., San Rafael, Calif.
- Milcor Steel Co., Milwaukee, Wis.
- Neemes Foundry, Inc., Troy, N. Y.
- Northern Furnace & Supply Company, Billings, Mont.
- Osborn Co., J. M. & L. A., Cleveland.
- Peters-Dalton, Inc., Detroit.
- Royal-Apex Mfg. Corp., Brooklyn.
- Rynker Steel Products Company, Billings, Mont.
- Schoedinger, F. O., Columbus, O.
- Sheet Metal Mfg. Co., Inc., Brooklyn.
- Sioux Steel Co., Sioux Falls, S. D.
- Southbridge Roofing Co., Inc., Southbridge, Mass.
- Sterling Foundry Company, Sterling, Ill. (Cast Iron).
- Tierney Rotor Ventilator Co., Minneapolis.
- Vall Mfg. Co., Fort Wayne, Ind.

CASINGS

See Cabinets and Casings

CAULKING COMPOUNDS

See Compounds, Caulking

CEILINGS, METAL

- Brooklyn Metal Ceiling Co., Brooklyn.
- Canton Steel Ceiling Co., New York City.
- Cincinnati Sheet Metal & Roofing Co., Cincinnati.
- Edwards Mfg. Co., Inc., Cincinnati.
- Friedley-Voshardt Co., Chicago.
- International Steel Company, Evansville, Ind.
- Klauser Mfg. Co., Dubuque, Ia.
- Martin-Parry Corp., York, Pa.
- Meaker & Co., Geo. L., Evansville, Ind.
- Sheet Metal Mfg. Co., Inc., Brooklyn.
- Simplex Ceiling Co., New York City (Perforated Panels).
- Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Woolwine Metal Products Co., Los Angeles.

CEMENT, FURNACE

- Acme Asbestos Covering & Flooring Co., Chicago.
- Armstrong Co., Detroit.

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- Botfield Refractories Co., Philadelphia.
 Buckeye Products Co., Cincinnati.
 Carey Co., Philip, Lockland, Ohio.
 Chicago Fire Brick Company, Chicago.
 Clinton Metallic Paint Co., Clinton, N. Y. (Asbestos).
 Colebrook & Sons, Inc., W. H., Syracuse, N. Y.
 Continental Products Co., Euclid, O.
 Ehret Magnesia Mfg. Co., Valley Forge, Pa.
 • Fireline Stove & Furnace Lining Co., Chicago. (Asbestos).
 Glidden Company, Cleveland.
 Green Fire Brick Co., A. P., Mexico, Mo.
 Hercules Chemical Co., Inc., New York City.
 Hetzel Roofing Products Co., Newark, N. J.
 Johns-Manville, New York City.
 Keasbey Co., Robert A., New York City (Asbestos).
 Klee Co., George B., Cincinnati.
 Krehbiel Co., J. H., Chicago.
 Laclede-Christy Clay Products Co., St. Louis.
 Lastik Products Co., Inc., Pittsburgh.
 McLeod & Henry Co., Inc., Troy, N. Y.
 Munn and Steele, Inc., Newark, N. J.
 Nebel Manufacturing Co., Cleveland.
 Pecora Paint Co., Philadelphia (Asbestos).
 Plastic Products Co., Detroit.
 Preferred Utilities Mfg. Corp., New York City.
 Presstite Engineering Co., St. Louis.
 Pyrolite Products Co., Cleveland.
 Quigley Company, Inc., New York City.
 Refractory & Insulation Corp., New York City.
 Ruberoid Co., New York City.
 Rutland Fire Clay Co., Rutland, Vt.
 • Sall Mountain Co., Chicago.
 Sauereisen Cements Co., Sharpsburg, Pa.
 Standard Asbestos Mfg. Co., Chicago.
 Standard Fuel Engineering Co., Detroit.
 Tamm Silica Company, Chicago.
 Taylor Sons Co., Charles, Cincinnati, O.
 U. S. Stoneware Company, Akron, Ohio, and New York City.
 Walsh Refractories Corp., St. Louis.
 Wilhelm Co., A., Reading, Pa.
 • Wilson, Inc., Grant, Chicago (Asbestos).

CEMENT, INSULATING

- Acme Asbestos Covering & Flooring Co., Chicago. (Asbestos, mineral wool and magnesia).
 Alton Mineral Wool Insulation Co., Alton, Ill.
 Baldwin-Hill Co., Trenton, N. J. (Rockwool).
 Barrett Division, Allied Chemical & Die Corporation, New York City.
 Bird Archer Co., Philadelphia.
 Botfield Refractories Co., Philadelphia.
 Carey Co., Philip, Lockland, Ohio (Asbestos, Mag., Rockwool).
 Carney Rockwell Co., Mankato, Minn. (Rockwool).
 Chicago Fire Brick Co., Chicago (Asbestos).
 Clinton Metallic Paint Co., Clinton, N. Y.
 Colebrook & Sons, Inc., W. H., Syracuse, N. Y.
 Eagle-Picher Lead Co., Cincinnati (Asbestos).
 Ehret Magnesia Mfg. Co., Valley Forge, Pa. (Asbestos).
 Green Fire Brick Company, A. P., Mexico, Mo. (Vermiculite).
 Industrial Research, Lansdowne, Pa.
 International Vermiculite Co., Girard, Ill.
 Johns-Manville, New York City (Asbestos).
 Keasbey Co., Robert A., New York City (Asbestos).
 Keasbey & Mattison Co., Ambler, Pa. (Asbestos).
 Krehbiel Co., J. H., Chicago (Asbestos, mineral wool).
 McLeod & Henry Co., Inc., Troy, N. Y.
 Mitchell & Smith, Inc., Mineral Felt Div., Detroit (Rock Wool).
 Munn and Steele, Inc., Newark, N. J. (Vermiculite).
 National Gypsum Co., Buffalo. (Rock wool).
 Nelson Mfg. Co., B. F., Minneapolis (Vermiculite, Asbestos).
 Norristown Magnesite & Asbestos Co., Norristown, Pa.
 Ohmlac Paint & Refining Co., Chicago (Asphalt, Asbestos).
 • Owens-Corning Fiberglass Corp., Toledo, Ohio (Mineral Wool).
 Plant Rubber & Asbestos Works, Inc., San Francisco (Asbestos).
 Plibrico Jointless Firebrick Co., Chicago. (Mineral wool).
 Poe Co., C. W., Cleveland (Mineral Wool).
 Preferred Utilities Mfg. Corp., New York City.
 Pyrolite Products Co., Cleveland.
 Quigley Company, Inc., New York City (Asbestos).
 Ramtite Co., Div. of S. Obermayer Co., Chicago.
 Refractory & Insulation Corp., New York City (Wool).
 Rex Clay Products Co., Detroit.
 Robinson Insulation Co., Great Falls, Mont. (Vermiculite).
 Rock Fleece Co., El Paso, Texas.
 Ruberoid Co., New York City (Asbestos).
 Rutland Fire Clay Co., Rutland, Vt. (Asbestos).
 • Sall Mountain Co., Chicago.
 Sauereisen Cements Co., Pittsburgh.
 Schundler & Co., Inc., F. E., Joliet, Ill.
 Smith & Kansler Corp., Elizabeth, N. J. (Asbestos).
 Standard Asbestos Mfg. Co., Chicago.
 Standard Fuel Engineering Co., Detroit (Rock wood and asbestos).
 Tennessee Products Corp., Nashville, Tenn. (Mineral Wool).
 Therminsul Corp., Kalamazoo, Mich.
 Thompson & Co., Oakmont (Pittsburgh Dist.), Pa.
 United States Mineral Wool Co., Chicago (High temperature mineral wool).
 Universal Zonolite Insulation Co., Chicago (Vermiculite).

- Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.
 • Wilson, Inc., Grant, Chicago (Asbestos).

CEMENT, REFRACTORY

See Refractories

CEMENT, ROOF

- Acme Asbestos Covering & Flooring Co., Chicago.
 Acme Refining Co., Cleveland (Liquid and plastic).
 Acme White Lead & Color Works, Detroit.
 Acorn Refining Co., Cleveland.
 All States Roofers Equipment & Material Co., Chicago.
 American-Marietta Company, Chicago.
 • Armstrong Co., Detroit.
 Babbitt-Barber Asphalt Products, Inc., Madison, Ill.
 Barrett Division, Allied Chemical & Die Corporation, New York City.
 Bird & Son, Inc., East Walpole, Mass.
 Calbar Paint & Varnish Co., Philadelphia.
 Carey Co., Philip, Lockland, Ohio.
 Carter Paint Co., Liberty, Ind.
 Celotex Corp., Chicago.
 Certain-teed Products Corp., New York City.
 Clinton Metallic Paint Co., Clinton, N. Y.
 Connors Paint Mfg. Co., Wm., Troy, N. Y.
 Continental Products Co., Euclid, O.
 Ehret Magnesia Mfg. Co., Valley Forge, Pa.
 • Elaterite Plastic Products, Canton, O.
 Flintkote Co., New York City.
 Ford Roofing Products Co., Chicago.
 Glidden Co., Cleveland.
 Hetzel Roofing Products Co., Newark, N. J.
 Horn Co., A. C., Long Island City, N. Y.
 Iowa Paint Mfg. Co., Des Moines, Ia. (Asphalt).
 Johns-Manville, New York City.
 Koppers Company, Inc., Pittsburgh.
 Krehbiel Co., J. H., Chicago (Asphaltic, Gilsomite, Elaterite).
 Lastik Products Co., Inc., Pittsburgh.
 Lehon Company, Chicago.
 Midland Paint & Varnish Co., Cleveland (Fiberseal).
 Miller & Son, C. Arthur, Elmira, N. Y.
 National Mfg. Corp., Tonawanda, N. Y.
 Nebel Manufacturing Co., Cleveland.
 Nelson Mfg. Co., B. F., Minneapolis (Master Asphalt).
 North American Fibre Products Co., Cleveland.
 Ohmlac Paint & Refining Co., Chicago.
 Pecora Paint Co., Philadelphia (Asbestos).
 Presstite Engineering Co., St. Louis.
 Pyrolite Products Co., Cleveland.
 Rock Fleece Company, El Paso, Texas.
 Ruberoid Co., New York City.
 Rutland Fire Clay Co., Rutland, Vt.
 Smooth-On Mfg. Co., Jersey City, N. J.
 Sonneborn Sons, Inc., L., New York City.
 Southport Paint Co., Savannah, Ga.
 Thompson & Co., Oakmont (Pittsburgh Dist.), Pa.
 Tropical Paint & Oil Co., Cleveland.
 United States Gypsum Co., Chicago.
 Wilhelm Co., A., Reading, Pa.

CHAIN, FURNACE

- American Chain Div., American Chain & Cable Co., Inc., York, Pa.
 • Bead Chain Mfg. Co., Bridgeport, Conn.
 Bridgeport Chain & Mfg. Co., Bridgeport, Conn.
 Corbin Screw Corp., New Britain, Conn.
 • Hart & Cooley Mfg. Co., Holland, Mich.
 Hodell Chain Co., Cleveland.
 McKay Co., York, Pa.
 Russell Mfg. Co., John M., Naugatuck, Conn.
 Turner & Seymour Mfg. Co., Torrington, Conn.
 • United States Register Co., Battle Creek, Mich.

CHAMBERS, COMBUSTION, PREFORMED

- Barclay, Inc., Robert, Chicago.
 Chicago Fire Brick Company, Chicago.
 Commonwealth Products Co., Philadelphia.
 Gilbert & Son, Harry E., Bridgeport, Conn. (Radiant Silicons)
 Green Fire Brick Company, A. P., Mexico, Mo.
 Harvey, Inc., Sld, Valley Stream, N. Y.
 McLeod & Henry Co., Inc., Troy, N. Y.
 Monogram Combustion Chamber Co., Philadelphia.
 Munn and Steele, Inc., Newark, N. J. (Light fired refractory).
 • Peterson Co., B. A., Dowagiac, Mich.
 Preferred Utilities Manufacturing Corp., New York City.
 Rex Clay Products Company, Detroit.
 Universal Zonolite Insulation Co., Chicago (Vermiculite concrete).

CHANNELS

See Angles, Bars, Beams, Channels and Tees
 (Light Weight Shapes)

CHEMICALS, RUST PREVENTIVE FOR PRETREATING METALS

- American Chemical Paint Co., Ambler, Pa.
 du Pont de Nemours & Co., Inc., E. I., Wilmington, Del.
 Nelico Chemical Co., Detroit.

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Nellson Chemical Co., Detroit.
 North American Fibre Products Co., Cleveland.
 Oakite Products, Inc., New York City.
 Parker Rust-Proof Co., Detroit.
 Pennsylvania Salt Mfg. Co., Philadelphia.
 Protective Coatings, Inc., Detroit.
 Rust Products Co. of America, Chicago.
 Rusticide Products Co., Cleveland.
 Standard Steel Spring Co., Gary, Ind.
 Truscon Laboratories, Detroit.
 Turco Products, Inc., Los Angeles.
 Western Reserve Laboratories, Cleveland.
 Wolfe-Kote Co., Sheboygan, Wis.

CHIMNEY CAPS

See Caps and Tops, Chimney

CLEANERS FOR STAINLESS STEEL

Oakite Products, Inc., New York City.
 Pennsylvania Salt Mfg. Co., Philadelphia.
 Turco Products, Inc., Los Angeles.

CLEANERS, POLISHERS AND FINISHERS, METAL

(Liquid, Paste and Powder)

du Pont de Nemours & Co., Inc., E. I., Wilmington, Del.
 NuSteel Company, Chicago.
 Oakite Products, Inc., New York City.
 Pennsylvania Salt Mfg. Co., Philadelphia.
 Quikley Company, Inc., New York City (Powder, Cake).
 Sonneborn Sons, Inc., L., New York City.
 Tamms Silica Company, Chicago.
 Turco Products, Inc., Los Angeles.
 Wolfe-Kote Co., Sheboygan, Wis. (Liquid).

CLEANERS, VACUUM, FURNACE

- Baker Furnace & Cleaner Mfg. Co., Toledo, O.
- Breuer Electric Mfg. Co., Chicago.
- Clements Mfg. Co., Chicago.
- Densmore-Quinlan Co., Kenosha, Wis.
- Dickson Coal Co., New York City.
- Doyle Vacuum Cleaner Co., Grand Rapids, Mich.
- Electric Vacuum Cleaner Co., Inc., Cleveland.
- Ideal Commutator Dresser Co., Sycamore, Ill.
- Kent Co., Inc., Rome, N. Y.
- Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
- National Super Service Co., Toledo, O.
- Spencer Turbine Co., Hartford, Conn.
- Sturtevant Co., B. F., Hyde Park, Boston.

CLEAT BENDERS

See Machines, Cleat Bending

CLEATS, DRIVE

See Connectors, Metal, for Metal Ducts

CLIPS, FASTENING, FOR ROOFING

- American Sheet Metal Works, New Orleans, La.
- Bard Manufacturing Co., Bryan, O.
- Berger Brothers Co., Philadelphia.
- Bridesburg Foundry Co., Philadelphia.
- Diamond Expansion Bolt Co., Inc., Garwood, N. J.
- Edwards Mfr. Co., Inc., Cincinnati.
- Milcor Steel Co., Milwaukee.
- Osborn Co., J. M. & L. A., Cleveland.
- Pfeifer, Wm., New York City.
- Southbridge Roofing Co., Inc., Southbridge, Mass.

CLIPS AND TIPS, DAMPER

- Adams Company, The, Dubuque, Iowa.
- Air Control Products, Inc., Coopersville, Mich.
- Berger Bros. Co., Philadelphia.
- Gerett Co., M. A., Milwaukee.
- Gosse Mfg. Co., Milwaukee.
- Grand Rapids Die & Tool Co., Grand Rapids, Mich.
- Griswold Mfg. Co., Erie, Pa.
- Hart & Cooley Mfg. Co., Holland, Mich.
- Howes-Woods Company, Cambridge, Mass.
- Kerentoff, G. L., Cincinnati.
- Milcor Steel Co., Milwaukee.
- Mueller Furnace Co., L. J., Milwaukee.
- Schoedinger, F. O., Columbus, Ohio.
- United States Register Co., Battle Creek, Mich.
- Young Regulator Co., Cleveland.

CLOTH AND NETTING, WIRE

Buffalo Wire Works Company, Buffalo.
 Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
 Cyclone Fence Division, American Steel & Wire Co., Waukegan, Ill.
 Wickwire Spencer Steel Co., New York City.

CO₂ ANALYZERS

See Analyzers, CO₂

COAL BURNERS, AUTOMATIC

See Stokers

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COATINGS, PROTECTIVE, METAL

Blue Ridge Talc Co., Inc., Henry, Va.
 Cordo Chemical Corp., Norwalk, Conn.
 Galv-Weld Products, Dayton, O.
 Goodrich Co., B. F., Akron, O.
 Mortell Co., J. W., Kankakee, Ill.
 Protective Coatings, Inc., Detroit.
 Socony Paint Products Div. of Socony-Vacuum Oil Co., Inc., New York City.
 Wilbur & William Co., Boston.

COILS, COOLING, DIRECT EXPANSION, FINNED

- Acme Industries, Inc., Jackson, Mich.
- Aerofin Corp., Syracuse, N. Y.
- Airtemp Division, Chrysler Corp., Dayton, O.
- American Coils, Inc., Newark, N. J.
- Beacon-Morris Corp., Boston, Mass.
- Betz Corporation, Hammond, Ind.
- Bohn Aluminum & Brass, Detroit.
- Bush Mfg. Co., Hartford, Conn.
- Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
- Chicago Metal Hose Corporation, Maywood, Ill.
- Conditionaire Unit Co., Chicago.
- Drayer-Hanson, Inc., Los Angeles.
- Extended Surface, Inc., Brooklyn, N. Y.
- Fedders Mfg. Co., Inc., Buffalo.
- Frigidaire Div., General Motors Corp., Dayton, Ohio.
- G & O Mfg. Co., New Haven, Conn.
- General Electric Co., Bloomfield, N. J.
- General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
- Griscom-Russell Co., The, New York City.
- Kauffman Air Conditioning Corp., St. Louis.
- Kennard Corporation, St. Louis.
- Kramer Trenton Co., Trenton, N. J.
- Larkin Coils, Inc., Atlanta, Ga.
- McCord Corporation, Detroit.
- McQuay, Inc., Minneapolis.
- Manufacturer's Fin Coil Co., Chicago.
- Marlo Coil Co., St. Louis.
- Murray Mfg. Co., D. J., Wausau, Wis.
- Niagara Blower Company, New York City.
- Peerless of America, Inc., Marion, Indiana.
- Refrigeration Appliances, Inc., Chicago.
- Refrigeration Economics Co., Inc., Canton, O.
- Reliance Refrigerating Machine Co., Chicago.
- Rempe Co., Chicago.
- Roessing Mfg. Co., Sharpsburg Sta., Pittsburgh.
- Rome-Turney Radiator Co., Rome, N. Y.
- Standard Galvanizing Co., Chicago.
- Sturtevant Company, B. F., Hyde Park, Boston.
- Super Radiator Corp., Minneapolis.
- Trane Co., La Crosse, Wis.
- United States Air Conditioning Corp., Minneapolis.
- Walter Mfg. Co., Milwaukee.
- X L Refrigerating Company, Inc., Chicago.
- York Corp., York, Pa.
- Young Radiator Co., Racine, Wis.

COILS, COOLING, WATER

- Acme Industries, Inc., Jackson, Mich.
- Aerofin Corp., Syracuse, N. Y.
- Airtemp Division, Chrysler Corp., Dayton, O.
- Beacon-Morris Corp., Boston.
- Bell & Gossett Co., Morton Grove, Ill.
- Betz Corporation, Hammond, Ind.
- Bohn Aluminum & Brass, Detroit.
- Bush Mfg. Co., Hartford, Conn.
- Campbell Heating Co., E. K., Kansas City.
- Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
- Conditionaire Unit Company, Chicago.
- Drayer-Hanson, Inc., Los Angeles.
- Extended Surface, Inc., Brooklyn, N. Y.
- Fedders Mfg. Co., Inc., Buffalo.
- Frigidaire Division, General Motors Corporation, Dayton, O.
- G & O Mfg. Co., New Haven, Conn.
- General Electric Co., Bloomfield, N. J.
- General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
- Griscom-Russell Co., The, New York City.
- Industrial Mfg. & Eng. Co., Chicago.
- Johnson Fan & Blower Corp., Chicago.
- Kauffman Air Conditioning Corp., St. Louis.
- Kennard Corporation, St. Louis.
- Kramer Trenton Co., Trenton, N. J.
- Larkin Coils, Inc., Atlanta, Ga.
- McCord Corporation, Detroit.
- McQuay, Inc., Minneapolis.
- Manufacturer's Fin Coil Co., Chicago.
- Marlo Coil Co., St. Louis.
- Modine Mfg. Co., Racine, Wis.
- Murray Mfg. Co., D. J., Wausau, Wis.
- Nesbitt, Inc., John J., Philadelphia.
- Niagara Blower Company, New York City.
- Palmer Manufacturing Corp., Phoenix, Ariz.
- Peerless of America, Inc., Marion, Indiana.
- Refrigeration Appliances, Inc., Chicago, Ill.
- Refrigeration Economics Co., Inc., Canton, O.

Rempe Co., Chicago.
 Roessing Mfg. Co., Sharpsburg Sta., Pittsburgh.
 Rome-Turney Radiator Co., Rome, N. Y.
 Standard Galvanizing Co., Chicago.
 Standard Heater & Oil Equipment Co., Jersey City, N. J.
 • Sturtevant Company, B. F., Hyde Park, Boston.
 Super Radiator Corp., Minneapolis.
 Trane Co., La Crosse, Wis.
 • United States Air Conditioning Corporation, Minneapolis.
 Vilter Mfg. Co., Milwaukee.
 Westinghouse Electric & Manufacturing Co., Springfield, Mass.
 Wing Manufacturing Co., L. J., New York City.
 X L Refrigerating Co., Inc., Chicago.
 York Corp., York, Pa.
 Young Radiator Co., Racine, Wis.

COILS, FIRE POT, HOT WATER

• Adams Company, The, Dubuque, Iowa.
 • Air Controls, Inc., Cleveland.
 • Brauer Supply Co., A. G., St. Louis.
 • Dowagiac Steel Furnace Co., Dowagiac, Mich.
 • Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis.
 Globe Machinery & Supply Co., Des Moines, Ia.
 Harvey-Whipple, Inc., Springfield, Mass.
 Hotstream Heater Co., Cleveland.
 Lennox Furnace Co., Marshalltown, Ia.
 Marshall Furnace Co., Marshall, Mich.
 Miller & Son, C. Arthur, Elmira, N. Y.
 • Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
 • Mueller Furnace Co., L. J., Milwaukee.
 Murray Mfg. Co., D. J., Wausau, Wis.
 Radiator Specialty Co., Charlotte, N. C.
 Rempe Co., Chicago.
 Rome-Turney Radiator Co., Rome, N. Y.
 • Rudy Furnace Co., Dowagiac, Mich.
 Taco Heaters, Inc., New York City.

COILS, HEATING

Aerofin Corp., Syracuse, N. Y.
 • Bayley Blower Co., Milwaukee.
 Beacon-Morris Corporation, Boston.
 Betz Corporation, Hammond, Ind.
 Bohn Aluminum & Brass, Detroit.
 Bush Mfg. Co., Hartford, Conn.
 Campbell Heating Co., E. K., Kansas City, Mo.
 Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
 Conditionaire Unit Company, Chicago.
 Drayer-Hanson, Inc., Los Angeles.
 Extended Surface, Inc., Brooklyn, N. Y.
 Fedders Mfg. Co., Inc., Buffalo.
 Frigidaire Division, General Motors Corporation, Dayton, O.
 G & O Mfg. Co., New Haven, Conn.
 General Electric Co., Bloomfield, N. J.
 Griscom-Russell Co., New York City.
 Industrial Mfg. & Eng. Co., Chicago.
 Johnson Fan & Blower Corp., Chicago.
 Kauffman Air Conditioning Corp., St. Louis.
 Kennard Corporation, St. Louis.
 Kramer Trenton Co., Trenton, N. J.
 Larkin Colls, Inc., Atlanta, Ga.
 McCord Corporation, Detroit.
 McQuay, Inc., Minneapolis.
 Manufacturer's Fin Coil Co., Chicago.
 Mario Coil Co., St. Louis.
 Modine Mfg. Co., Racine, Wis.
 Murray Mfg. Co., D. J., Wausau, Wis.
 Nesbitt, Inc., John J., Philadelphia.
 New York Blower Co., Chicago.
 Niagara Blower Co., New York City.
 Peerless of America, Inc., Marion, Indiana.
 Refrigeration Appliances, Inc., Chicago.
 Refrigeration Economics Co., Inc., Canton, Ohio.
 Rempe Co., Chicago.
 Roessing Manufacturing Co., Pittsburgh.
 Rome-Turney Radiator Co., Rome, N. Y.
 Standard Heater and Oil Equipment Co., Jersey City.
 • Sturtevant Co., B. F., Hyde Park, Boston.
 Super Radiator Corp., Minneapolis.
 Trane Co., La Crosse, Wis.
 • United States Air Conditioning Corporation, Minneapolis.
 Whitlock Mfg. Co., Hartford, Conn.
 Wing Mfg. Co., L. J., New York City.
 York Corp., York, Pa.
 Young Radiator Co., Racine, Wis.

COLLECTORS, BLOW PIPE

Aget-Detroit Co., Ann Arbor, Mich.
 Allen Billmyre Co., Mamaroneck, N. Y.
 Allington & Curtis Mfg. Co., Saginaw, Mich.
 • American Air Filter Co., Inc., Louisville, Ky.
 American Blower Corp., Detroit.
 American Foundry Equipment Co., Mishawaka, Ind.
 American Metal Products Co., Fort Worth, Texas.
 Bargar Sheet Metal Co., Cleveland.
 • Bayley Blower Co., Milwaukee.
 Blower Application Co., Milwaukee.
 Bubar, Hudson, H., New York City.
 Buffalo Forge Co., Buffalo.
 Centri-Spray Co., Detroit.

Clark Dust Control Company, Chicago.
 Day Co., Minneapolis.
 Dracco Corp., Cleveland.
 Garden City Fan Co., Chicago.
 Goethel Sheet Metal Works, Alfred, Milwaukee.
 Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
 Jacobs Co., B. & J., Cincinnati.
 Kirk & Blum Mfg. Co., Cincinnati.
 Kluegel & Co., E., St. Paul, Minn.
 Knickerbocker Co., Jackson, Mich.
 Kopperman & Sons, Joseph, Philadelphia.
 Lumm Co., A. H., Toledo, Ohio.
 Northern Blower Co., Cleveland.
 Pangborn Corp., Hagerstown, Md.
 Peters-Dalton, Inc., Detroit.
 Prat-Daniel Corp., Port Chester, N. Y.
 Puhl & Hepper Mfg. Co., Inc., St. Louis.
 Research Corp., New York City.
 Ruemelin Mfg. Co., Milwaukee.
 Schmiegl Industries, Detroit.
 Schneible Co., Claude B., Detroit.
 Skinner Heating & Vent Co., Heater Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis.
 Sly Mfg. Co., W. W., Cleveland.
 Southbridge Roofing Company, Inc., Southbridge, Mass.
 Spencer Turbine Co., Hartford, Conn.
 Steinhurst & Sons, Inc., Emil, Utica, N. Y.
 Strandwitz & Co., Inc., W. J., Camden, N. J.
 • Sturtevant Co., B. F., Hyde Park, Boston.
 Torit Manufacturing Co., St. Paul, Minn.
 Western Blower Co., Seattle, Wash.
 Western Precipitation Corp., Los Angeles.
 Whiting Corporation, Harvey, Ill.
 Winkler & Sons, Inc., A. E., Milwaukee.
 Young & Bertke Co., Cincinnati.

COMBUSTION CHAMBERS

See Chambers, Combustion, Preformed

COMPOUNDS, CAULKING

Accurate Metal Weather Strip Co., New York City.
 Acme Refining Co., Cleveland.
 Acme White Lead & Color Works, Detroit.
 Acorn Refining Company, Cleveland.
 Allmetal Weatherstrip Co., Chicago.
 Alpha Metals, Inc., Brooklyn.
 American-Marletta Company, Chicago.
 American Metal Weather Strip Co., Grand Rapids, Mich.
 • Armstrong Co., Detroit.
 Asphalt Products Co., Inc., Syracuse, N. Y.
 Babbitt Industrial Specialties Co., New York City.
 Barland Weatherstrip Material Co., Cleveland.
 Blue Ridge Talc Co., Inc., Henry, Va.
 Calbar Paint & Varnish Co., Philadelphia.
 Carey Co., Philip, Lockland, Ohio.
 Carter Paint Co., Liberty, Ind.
 Chamberlin Metal Weatherstrip Co., Detroit.
 Cheesman-Elliott Company, Inc., Brooklyn.
 Clinton Metallic Paint Co., Clinton, N. Y.
 Continental Products Co., Euclid, O.
 Cordo Chemical Corp., Norwalk, Conn.
 Eagle-Picher Lead Co., Cincinnati, O.
 Flintkote Co., New York City.
 Ford Roofing Products Co., Chicago.
 Glidden Company, Cleveland.
 Goodrich Co., B. F., Akron, O.
 Hetzel Roofing Products Co., Newark, N. J.
 Horn Co., A. C., Long Island City, N. Y.
 Iowa Paint Mfg. Co., Des Moines, Ia.
 Johns-Manville, New York City.
 Krehbiel Co., J. H., Chicago.
 Lastik Products Co., Inc., Pittsburgh.
 Lehon Company, Chicago.
 Maas and Waldstein Co., Newark, N. J.
 Metropolitan Refining Co., Long Island City, N. Y.
 Midland Paint & Varnish Co., Cleveland.
 Mortell Co., J. W., Kankakee, Ill.
 National Mfg. Corp., Tonawanda, N. Y.
 Nebel Manufacturing Co., Cleveland.
 North American Fibre Products Co., Cleveland.
 Ohmlac Paint & Refining Co., Chicago (Asphalt).
 Pecora Paint Co., Philadelphia.
 Pittsburgh Plate Glass Co., Pittsburgh.
 Plastic Products Co., Detroit.
 Presstite Engineering Co., St. Louis.
 Pyrolite Products Co., Cleveland.
 Quigley Company, Inc., New York City.
 Radiator Specialty Co., Charlotte, N. C.
 Reilly Tar & Chemical Corp., Indianapolis.
 Sherwin-Williams Co., Cleveland.
 Sipe & Company, James B., Pittsburgh.
 Smooth-on Mfg. Co., Jersey City, N. J.
 Sonneborn Sons, Inc., L., New York City.
 Southport Paint Company, Savannah, Ga.
 Tamms Silica Company, Chicago.
 Thompson & Co., Oakmont (Pittsburgh Dist.), Pa.
 Tropical Paint & Oil Co., Cleveland.
 Truscon Laboratories, Detroit.
 U. S. Stoneware Company, Akron, Ohio, and New York City.

• Advertisement in this issue. See Index to Advertisers, page 324.

Wilhelm Co., A., Reading, Pa.
X-Pando Corp., Long Island City, N. Y.
Yardley Venetian Blind Co., Columbus, Ohio.

COMPOUNDS, GLAZING

- Acme Refining Co., Cleveland.
- Acme White Lead & Color Works, Detroit.
- Acorn Refining Company, Cleveland.
- Armstrong Co., Detroit.
- Blue Ridge Talc Co., Inc., Henry, Va.
- Calbor Paint & Varnish Co., Philadelphia.
- Chamberlin Metal Weather Strip Co., Detroit.
- Continental Products Co., Euclid, O.
- Glidden Company, Cleveland.
- Goodrich Co., B. F., Akron, O.
- Hetzel Roofing Products Co., Newark, N. J.
- Horn Co., A. C., Long Island City, N. Y.
- Lastik Products Co., Inc., Pittsburgh.
- Midland Paint & Varnish Co., Cleveland.
- Mortell Co., J. W., Kankakee, Ill.
- Nebel Manufacturing Co., Cleveland.
- North American Fibre Products Co., Cleveland.
- Pecora Paint Co., Philadelphia.
- Pittsburgh Plate Glass Company, Pittsburgh.
- Plastic Products Co., Detroit.
- Presstite Engineering Co., St. Louis.
- Pyrolite Products Co., Cleveland.
- Sherwin-Williams Co., Cleveland.
- Sonneborn Sons, Inc., L., New York City.
- Southport Paint Co., Savannah, Ga.
- Tamms Silica Company, Chicago.
- Thompson & Co., Oakmont (Pittsburgh Dist.), Pa.
- Tropical Paint & Oil Co., Cleveland.
- Truscon Laboratories, Detroit.
- X-Pando Corporation, Long Island City, N. Y.

COMPOUNDS, TINNING

- Alpha Metals, Inc., Brooklyn.
- American Solder & Flux Co., Philadelphia.
- Burnley Battery & Mfg. Co., North East, Pa.
- Eagle-Picher Lead Co., Cincinnati.
- Farelloy Company, Inc., Philadelphia.
- Lukens Metal Co., Thos. F., Philadelphia.
- Motex Metal Process Corporation, Detroit.
- Potomac Mfg. Co., Philadelphia.
- Ruby Chemical Co., Columbus, O.
- Tinit Manufacturing Co., Inc., Denver, Colo.
- Turco Products, Inc., Los Angeles.

COMPOUNDS, WATER-PROOFING

- Acme White Lead & Color Works, Detroit.
- Acorn Refining Co., Cleveland.
- Asphalt Products Co., Inc., Syracuse, N. Y.
- Babbitt-Barber Asphalt Products, Inc., Madison, Ill.
- Baldwin-Hill Company, Trenton, N. J.
- Barrett Division, Allied Chemical & Die Corporation, New York City.
- Belmont Smelting & Refining Works, Inc., Brooklyn.
- Blue Ridge Talc Co., Inc., Henry, Va.
- Carey Co., Philip, Lockland, Ohio.
- Continental Products Co., Euclid, Ohio.
- Eastern States Supply Co., Brooklyn, N. Y.
- Elasterite Plastic Products, Canton, O. (Plastic).
- Flintkote Co., New York City.
- Ford Roofing Products Company, Chicago.
- Gerard Chemical Co., Elizabeth, N. J.
- Glidden Co., The, Cleveland.
- Hetzel Roofing Products Co., Newark, N. J.
- Horn Co., A. C., Long Island City, N. Y.
- Johns-Manville, New York City.
- Koppers Co., Inc., Pittsburgh.
- Lastik Products Co., Inc., Pittsburgh.
- Nebel Manufacturing Co., Cleveland.
- North American Fibre Products Co., Cleveland.
- Pecora Paint Co., Philadelphia.
- Presstite Engineering Co., St. Louis.
- Protective Coatings, Inc., Detroit.
- Pyrolite Products Co., Cleveland.
- Reilly Tar & Chemical Corp., Indianapolis.
- Robertson Co., H. H., Pittsburgh (Processed Asphalt).
- Sauereisen Cements Co., Sharpsburg, Pa.
- Self-Vulcanizing Rubber Co., Inc., Chicago.
- Sherwin-Williams Co., Cleveland.
- Sipe & Company, James B., Pittsburgh.
- Smooth-On Mfg. Co., Jersey City, N. J.
- Sonneborn Sons, Inc., L., New York City.
- Southport Paint Co., Savannah, Ga.
- Thompson & Co., Oakmont (Pittsburgh Dist.), Pa.
- Truscon Laboratories, Detroit.
- Wallis Dove-Hermiston Corporation, Westfield, N. J.
- Wilhelm Co., A., Reading, Pa.
- X-Pando Corp., Long Island City, N. Y.

COMPOUNDS, WELDING

- American Solder & Flux Co., Philadelphia.
- Midland Paint & Varnish Co., Cleveland.
- Turco Products, Inc., Los Angeles.
- Universal Power Corporation, Cleveland.
- Wolfe-Kote Co., Sheboygan, Wis.

COMPRESSORS, REFRIGERATING

- Air Conditioning and Refrigeration Div., Worthington Pump & Machinery Corp., Harrison, N. J.
- Airtemp Division, Chrysler Corp., Dayton, O.
- Baker Ice Machine Co., Inc., Omaha, Nebr.
- Brunner Mfg. Co., Utica, N. Y.
- Carrier Corp., Syracuse, N. Y.
- Copeland Refrigeration Corp., Sidney, Ohio.
- Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis.
- Diceler Corp., Gasport, N. Y.
- Frick Co., Waynesboro, Pa.
- Frigidaire Division, General Motors Corporation, Dayton, O.
- General Electric Co., Bloomfield, N. J.
- General Machinery Co., Spokane, Wash. (Ammonia).
- General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
- Howe Ice Machine Co., Chicago.
- Ingersoll-Rand, New York City.
- Kauffman Air Conditioning Corp., St. Louis.
- Kelvinator Div., Nash-Kelvinator Corp., Detroit.
- Lynch Manufacturing Corporation, Defiance, O.
- Merchant & Evans Co., Philadelphia.
- Mills Novelty Co., Chicago.
- Phoenix Ice Machine Co., Cleveland.
- Reliance Refrigerating Machine Co., Chicago.
- Reynolds Manufacturing Co., Springfield, Mo.
- Servel, Inc., Evansville, Ind.
- Starr Piano Co., Richmond, Ind.
- Stewart Ice Machine Co., Los Angeles.
- Tecumseh Products Co., Tecumseh, Mich.
- Trane Co., La Cross, Wis.
- Universal Cooler Corp., Marion, Ohio.
- Vilter Mfg. Co., Milwaukee.
- Westinghouse Electric & Mfg. Co., Springfield, Mass.
- Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
- Wittenmeyer Machinery Co., Chicago.
- X L Refrigerating Co., Chicago.
- Yeomans Brothers Co., Chicago.
- York Corp., York, Pa.

CONDUCTOR PIPE

See Pipe, Conductor

CONNECTIONS, DUCT, FLEXIBLE (Asbestos, Canvas, etc.)

- Canvas Products Co., St. Louis.
- Chicago Metal Hose Corp., Maywood, Ill.
- Felter Co., The, Boston.
- United States Rubber Co., New York City.
- Wilson, Inc., Grant, Chicago (Asbestos).

CONNECTORS, METAL, FOR METAL DUCTS (Drive Cleat)

- Char-Gale Mfg. Co., Minneapolis.
- Corbman Bros., Inc., Philadelphia.
- International Heater Co., Utica, N. Y.
- Milcor Steel Company, Milwaukee.
- Mueller Furnace Company, L. J., Milwaukee.
- Sheetlock Co., Chicago.
- Waterman-Waterbury Co., Minneapolis.

CONNECTORS, METAL, FOR SUBSTITUTE DUCTS

- Lumm Co., A. H., Toledo, Ohio.
- Sheetlock Co., Chicago.

CONTROL SYSTEMS, FORCED AIR FURNACE, HAND-FIRED (PACKAGE)

(Bonnet Control of Blower)

- Barclay, Inc., Robert, Chicago.
- Cook Electric Co., Chicago.
- Merco Corporation, Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, Ohio.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- Schwab Safe Co., Lafayette, Ind.
- Spencer Thermostat Company, Attleboro, Mass.
- White Manufacturing Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis.

CONTROL SYSTEMS, FORCED AIR FURNACE, HAND-FIRED (PACKAGE)

(Thermostat Control of Blower)

- Cook Electric Co., Chicago.
- General Controls Co., Glendale, Calif.
- Merco Corp., Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- Schwab Safe Co., Lafayette, Ind.
- Spencer Thermostat Company, Attleboro, Mass.

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- White Manufacturing Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis.

CONTROL SYSTEMS, GRAVITY FURNACE, HAND-FIRED (PACKAGE)

- Automatic Products Co., Milwaukee.
- Cook Electric Co., Chicago.
- Crise Electric Mfg. Co., Columbus, Ohio.
- Defender Instrument and Regulator Co., St. Louis.
- General Controls Co., Glendale, Calif.
- Gleason-Avery, Inc., Auburn, N. Y.
- Mercoild Corp., Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, Ohio.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- Schwab Safe Co., Lafayette, Ind.
- Spencer Thermostat Company, Attleboro, Mass.
- White Manufacturing Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis.

CONTROL SYSTEMS, ZONE DISTRIBUTION, COMPLETE

- Au-Temp-Co Corp., New York City.
- Barber-Colman Company, Rockford, Ill.
- Cook Electric Co., Chicago.
- Dunham Co., C. A., Chicago.
- General Controls Co., Glendale, Cal.
- Mercoild Corp., Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Sampsel Time Control, Inc., Spring Valley, Ill.

CONTROLS, COMBINED FAN AND LIMIT, LINE VOLTAGE

- Defender Instrument and Regulator Co., St. Louis.
- Detroit Lubricator Co., Detroit.
- General Controls Co., Glendale, Cal.
- Mercoild Corp., Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, Ohio.
- Schwab Safe Co., Lafayette, Ind.
- White-Rodgers Electric Co., St. Louis.

CONTROLS, COMBINED FAN AND LIMIT, LOW VOLTAGE

- Cook Electric Co., Chicago.
- Defender Instrument and Regulator Co., St. Louis.
- Detroit Lubricator Co., Detroit.
- Mercoild Corp., Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee.
- Schwab Safe Co., Lafayette, Ind.
- White Manufacturing Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis.

CONTROLS, COMBUSTION, BONNET OR SMOKE-PIPE, LINE VOLTAGE

- Barber-Colman Co., Rockford, Ill.
- Cook Electric Co., Chicago.
- Detroit Lubricator Co., Detroit.
- General Controls Co., Glendale, Calif.
- Hays Corp., Michigan City, Ind.
- Hotstream Heater Co., Cleveland.
- Mercoild Corporation, Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Perfex Corporation, Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Sampsel Time Control, Inc., Spring Valley, Ill.

CONTROLS, COMBUSTION, BONNET OR SMOKE-PIPE, LOW VOLTAGE

- Cook Electric Co., Chicago.
- Detroit Lubricator Co., Detroit.
- General Controls Co., Glendale, Cal.
- Hotstream Heater Co., Cleveland.
- Mercoild Corporation, Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- White Manufacturing Co., St. Paul, Minn.

CONTROLS, DRAFT, BAROMETRIC

- Atlas Valve Co., Newark, N. J.
- Barber-Colman Company, Rockford, Ill.
- Cole-Sullivan Engineering Co., Minneapolis.
- Defender Instrument and Regulator Co., St. Louis.
- Empire Ventilation Equipment Co., Long Island City, N. Y.
- Field Control Div., H. D. Conkey & Co., Mendota, Ill.

- Herd Utilities, Inc., Providence, R. I. (Thermostatic).
- Hotstream Heater Co., Cleveland. (Automatic).
- James Regulator Co., Inc., Pottsville, Pa.
- Kieley & Mueller, Inc., North Bergen, N. J.
- Mason-Neelan Regulator Co., Dorchester, Mass.
- Perfex Corporation, Milwaukee.
- Platt Products Corporation, Lansing, Mich.
- Polk Mfg. Co., Madison, Wis. (Combination).
- Preferred Utilities Mfg. Corp., New York City.
- Simplex Manufacturing Co., Fond du Lac, Wis.
- Walker Mfg. & Sales Corp., St. Joseph, Mo.
- Wheelco Instrument Co., Chicago.

CONTROLS, EFFECTIVE TEMPERATURE

- Barber-Colman Co., Rockford, Ill.
- Friez Instrument Division, Towson, Md.
- Fulton Syphon Co., Knoxville, Tenn.
- Mercoild Corporation, Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Tagilabue Mfg. Co., C. J., Brooklyn.

CONTROLS, FAN, LINE VOLTAGE

- Allen-Bradley Co., Milwaukee.
- Arrow-Hart & Hegeman Electric Co., Hartford, Conn.
- Barber-Colman Co., Rockford, Ill.
- Clark Controller Co., Cleveland.
- Cook Electric Co., Chicago.
- Detroit Lubricator Co., Detroit.
- Gleason-Avery, Inc., Auburn, N. Y.
- Hart Manufacturing Co., Hartford, Conn.
- Mercoild Corporation, Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Paragon Electric Co., Chicago.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Ranco, Inc., Columbus, O.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- Sarco Co., Inc., New York City.
- Schwab Safe Co., Lafayette, Ind.
- Spencer Thermostat Co., Attleboro, Mass.
- United Electric Controls Co., South Boston, Mass.
- White-Rodgers Electric Co., St. Louis.

CONTROLS, FAN, LOW VOLTAGE

- Allen-Bradley Co., Milwaukee.
- Arrow-Hart & Hegeman Electric Co., Hartford, Conn.
- Barber-Colman Co., Rockford, Ill.
- Clark Controller Co., Cleveland.
- Cook Electric Co., Chicago.
- Detroit Lubricator Co., Detroit.
- Gleason-Avery, Inc., Auburn, N. Y.
- McCorkle Co., D. H., Berkeley, Calif.
- Mercoild Corp., Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- Sarco Company, Inc., New York City.
- Schwab Safe Co., Lafayette, Ind.
- Spencer Thermostat Co., Attleboro, Mass.
- United Electric Controls Co., South Boston, Mass.
- White Manufacturing Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis.

CONTROLS, HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS, PNEUMATIC

- Atlas Valve Co., Newark, N. J.
- Bristol Co., Waterbury, Conn.
- Foxboro Co., Foxboro, Mass.
- Fulton Syphon Co., Knoxville, Tenn.
- Johnson Service Co., Milwaukee.
- Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Powers Regulator Co., Chicago.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- Tagilabue Mfg. Co., C. J., Brooklyn.
- Taylor Instrument Companies, Rochester, N. Y.

CONTROLS, LIMIT, LINE VOLTAGE

- Allen-Bradley Co., Milwaukee.
- Cook Electric Co., Chicago.
- Detroit Lubricator Co., Detroit.
- General Electric Co., Schenectady, N. Y.
- Gleason-Avery, Inc., Auburn, N. Y.
- Hart Manufacturing Co., Hartford, Conn.
- Mercoild Corporation, Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- Sarco Co., Inc., New York City.
- Schwab Safe Co., Lafayette, Ind.
- Spencer Thermostat Co., Attleboro, Mass.
- United Electric Controls Co., South Boston, Mass.

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- White Manufacturing Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis.

CONTROLS, LIMIT, LOW VOLTAGE

- Allen-Bradley Co., Milwaukee.
- Automatic Products Co., Milwaukee.
- Cook Electric Co., Chicago.
- Detroit Lubricator Co., Detroit.
- General Electric Co., Schenectady, N. Y.
- Gleason-Avery, Inc., Auburn, N. Y.
- McCorkle Co., D. H., Berkeley, Calif.
- Mercoid Corp., Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Mueller Furnace Co., L. J., Milwaukee.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- Sarco Co., Inc., New York City.
- Schwab Safe Co., Lafayette, Ind.
- Spencer Thermostat Co., Attleboro, Mass.
- United Electric Controls Co., South Boston, Mass.
- White Manufacturing Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis.

CONTROLS, OIL BURNER, COMPLETE ASSEMBLY

- Au-Temp-Co Corp., New York City.
- Automatic Products Co., Milwaukee.
- Defender Instrument and Regulator Co., St. Louis.
- Detroit Lubricator Co., Detroit.
- Mercoid Corporation, Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee.
- Schwab Safe Co., Lafayette, Ind.

CONTROLS, STOKER, COMPLETE ASSEMBLY

- Au-Temp-Co Corp., New York City.
- Defender Instrument and Regulator Co., St. Louis.
- Detroit Lubricator Co., Detroit.
- Gleason-Avery, Inc., Auburn, N. Y.
- Mercoid Corporation, Chicago, Ill.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Palmer Electric Co., Chicago.
- Paragon Electric Co., Chicago.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- Sarcotherm Controls, Inc., Chicago.
- Schwab Safe Co., Lafayette, Ind.
- Spencer Thermostat Co., Attleboro, Mass.
- White-Rodgers Electric Co., St. Louis.

CONTROLS, WINDOW CONDENSATION

Friez Instrument Div., Towson, Md.

COOLING SURFACE

See Coils, Cooling, Water

COPPERS, SOLDERING

- American Brass Co., Waterbury, Conn.
- Bernz Co., Otto, Rochester, N. Y.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Clendenin Brothers, Inc., Baltimore.
- Conklin Brass & Copper Co., Inc., T. E., New York City.
- Dual Remote Control Co., Wayne, Mich.
- Electric Materials Co., North East, Pa.
- Electric Soldering Iron Co., Inc., Deep River, Conn. (Electric)
- Everhot Mfg. Co., Maywood, Ill.
- General Electric Co., Schenectady, N. Y.
- Hexacon Electric Co., Roselle Park, N. J.
- Hussey & Co., C. G., Pittsburgh.
- Ideal Commutator Dresser Co., Sycamore, Ill.
- Imperial Brass Mfg. Co., Chicago.
- Lenk Mfg. Co., Newton Lower Falls, Mass.
- Linde Air Products Co., The, New York City.
- Minn-Kota Foundry & Mfg. Co., Fargo, N. Dak.
- Parker-Kalon Corp., New York City.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Reiner & Campbell Co., Inc., Elizabeth, N. J. (Carbide)
- Revere Copper & Brass, Inc., New York City.
- Sheet Metal Mfg. Co., Brooklyn.
- Sight Feed Generator Co., Richmond, Ind.
- Stanley Tools, New Britain, Conn.
- Sta-Warm Electric Co., Ravenna, O.
- Torit Manufacturing Co., St. Paul, Minn.
- Turner Brass Works, Sycamore, Ill.
- Vulcan Electric Co., Danvers, Mass.
- Wall Chemicals Div., Liquid Carbonic Corp., Chicago.
- Weiss & Co., H., New York City.

COUPLINGS, FLEXIBLE, POWER TRANSMISSION

- Ajax Flexible Couplings Co., Westfield, N. Y.
- Allis-Chalmers Mfg. Co., Milwaukee.
- American Flexible Coupling Co., Erie, Pa.
- Bartlett Hayward Co., Baltimore.
- Blood Brothers Machine Co., Allegan, Mich. (Universal joints)

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- Boston Gear Works, Inc., North Quincy, Mass.
- Browning Manufacturing Co., Inc., Maysville, Ky.
- Caldwell Co., W. E., Louisville, Ky.
- Certified Flexible Couplings, New York City.
- Chain Belt Co., Milwaukee.
- Chicago Die Casting Co., Chicago.
- Congress Die Casting Div., Congress Tool & Die Co., Detroit.
- Continental Diamond Fibre Co., Newark, Del.
- Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
- De Laval Steam Turbine Co., Trenton, N. J.
- Diamond Chain & Mfg. Co., Indianapolis.
- Dodge Mfg. Co., Mishawaka, Ind.
- Guardian Utilities Co., Michigan City, Ind.
- Jones Foundry Machine Co., W. A., Chicago.
- Link-Belt Co., Chicago.
- Lord Mfg. Co., Erie, Pa.
- Lovejoy Flexible Coupling Co., Chicago.
- Medart Co., St. Louis.
- Mercury Clutch Corporation, Canton, O.
- Moran Flexible Steam Joint Co., Louisville, Ky.
- Morse Chain Co., Ithaca, N. Y.
- Philadelphia Gear Works, Inc., Philadelphia.
- Poole Foundry & Machine Co., Baltimore.
- Ramsey Chain Co., Inc., Albany, N. Y.
- Shallcross Co., Philadelphia.
- Smith, Inc., Winfield H., Springfield, N. Y.
- Stewart-Rogers, Inc., Philadelphia.
- Stow Mfg. Co., Inc., Binghamton, N. Y.
- Thermoid Rubber Div. of Thermoid Co., Trenton, N. J.
- United States Rubber Co., New York City.
- Waldron Corp., John, New Brunswick, N. J.
- Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
- Whitney Chain & Mfg. Co., The, Hartford, Conn.
- Wood's Sons Co., T. B., Chambersburg, Pa.

CRIMPING MACHINES

See Machines, Crimping

DAMPER MOTORS

See Motors, Damper, Furnace Draft, Electrical

DAMPER CONTROLS

See Regulators, Damper Sets

DAMPER REGULATOR SETS

See Regulators, Damper Sets

DAMPERS, FOR WARM AIR PIPE

- Adams Co., Dubuque, Ia.
- Air Control Products Inc., Coopersville, Mich.
- Excelsior Stove & Mfg. Co., Quincy, Ill.
- Hart & Cooley Mfg. Co., Holland, Mich.
- Juniper Elbow Co., Inc., Middle Village, L. I., N. Y. (Tin)
- Lennox Furnace Co., Marshalltown, Ia.
- May-Flebeiger Company, Newark, Ohio.
- Peerless Foundry Co., Inc., Indianapolis.
- Sheet Metal Mfg. Co., Inc., Brooklyn.
- United States Register Co., Battle Creek, Mich.

DAMPERS, SMOKE PIPE

- Adams Co., The, Dubuque, Ia.
- Brauer Supply Co., A. G., St. Louis, Mo.
- Bros Boiler & Mfg. Co., Wm., Minneapolis.
- Char-Gale Mfg. Co., Minneapolis.
- Dickson Coal Co., New York City.
- Excelsior Stove & Mfg. Co., Quincy, Ill.
- Eselgroth & Co., Newark, N. J.
- Forest City Foundries Co., Niagara Furnace Div., Cleveland (Check Damper)
- Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis.
- Grand Rapids Die & Tool Co., Grand Rapids, Mich.
- Griswold Mfg. Co., Erie, Pa.
- Hotstream Heater Co., Cleveland.
- Juniper Elbow Co., Inc., Middle Village, L. I., N. Y. (Cast Iron)
- Keith Furnace Co., Des Moines, Ia.
- Maple City Furnace Co., Monmouth, Ill.
- Milcor Steel Co., Milwaukee.
- Mueller Furnace Co., L. J., Milwaukee.
- Peerless Foundry Co., Inc., Indianapolis.
- Preferred Utilities Manufacturing Corp., New York City.
- Royal-Apex Mfg. Corp., Brooklyn.
- Schoedinger, F. O., Columbus, O.
- Sheet Metal Mfg. Co., Inc., Brooklyn.
- United States Register Co., Battle Creek, Mich.
- Walker Mfg. & Sales Corp., St. Joseph, Mo.
- Williamson Heater Co., Cincinnati.

DAMPERS, STACK HEAD

- Air Conditioning Products Co., Detroit.
- Barber-Colman Co., Rockford, Ill.
- Controlair, Inc., Elyria, O.
- Richmond Radiator Co., Inc., New York City.
- Young Regulator Co., Cleveland.

DEHUMIDIFIERS, ABSORPTION AND ADSORPTION

- Air and Refrigeration Corp., New York City.
- Aqua-Sorb Co., East Orange, N. J.
- Bryant Heater Co., Cleveland (Silica gel).

Carbide and Carbon Chemicals Corp., New York City (Triethylene glycol).
 Cargoire Engineering Corp., New York City. (For ships).
 Carrier Corp., Syracuse, N. Y.
 Davison Chemical Corp., Baltimore, Md.
 Drying Systems, Inc., Chicago, Ill.
 Floridin Co., Warren, Pa.
 General Air Conditioning Corp., Cincinnati, O.
 Kaufman Co., H. J., Detroit. (Absorption).
 Pittsburgh Lechtdrodryer Corp., Pittsburgh. (Adsorption).
 Research Corp., New York City.
 Solvay Sales Corp., New York City.
 • Surface Combustion, Toledo, Ohio.
 Tamms Silica Co., Chicago.

DIES

See Presses and Dies

DIFFUSERS, AIR, HIGH VELOCITY

Air Devices, Inc., New York City.
 Anemostat Corporation of America, New York City.
 Barber-Colman Co., Rockford, Ill.
 Connor Eng. Corp., New York City. (High Velocity)
 Demuth & Sons, Charles, Mineola, L. I., N. Y.
 Dynamic Air Engineering, Inc., Los Angeles.
 Guth Co., Edwin F., St. Louis. (Ventilating, Diffusing, Terminals)
 • Tuttle & Bailey, Inc., New Britain, Conn.
 Waterloo Register Co., Waterloo, Ia.
 Wilster Air Devices, Inc., Cleveland.

DOORS, HOLLOW METAL

Advance Insulating Co., Pittsburgh.
 American Sheet Metal Works, New Orleans.
 Bayer Co., A. J., Los Angeles.
 Biersach & Niedermeyer Co., Milwaukee.
 Dahlstrom Metallic Door Co., Jamestown, N. Y.
 Decatur Iron & Steel Co., Decatur, Ala.
 Detroit Steel Products Co., Detroit.
 Edwards Mfg. Co., Inc., Cincinnati.
 International Steel Co., Evansville, Ind.
 Jamestown Metal Corp., Jamestown, N. Y.
 Kawneer Co., Niles, Mich.
 Maysteel Products, Inc., Mayville, Wis.
 Metal Door & Trim Co., La Porte, Ind.
 Newman Brothers, Inc., Cincinnati.
 Perkinson & Brown, Chicago.
 Richmond Fireproof Door Co., Richmond, Ind.
 Truscon Steel Co., Youngstown, O.

DOORS, KALAMEIN

American Sheet Metal Works, New Orleans.
 Biersach & Niedermeyer Co., Milwaukee.
 Dusing & Hunt, Inc., Buffalo.
 Edwards Mfg. Co., Inc., Cincinnati.
 Empire Door Co., Inc., New York City.
 Herrmann & Grace Co., Brooklyn.
 International Steel Co., Evansville, Ind.
 Mahon Co., R. C., Detroit.
 Mesker & Co., Geo. L., Evansville, Ind.
 Moeschl-Edwards Corrugating Co., Inc., Cincinnati.
 Newman Brothers, Inc., Cincinnati.
 Perkinson & Brown, Chicago.
 Richmond Fireproof Door Co., Richmond, Ind.
 Syracuse Fire Door Corp., Syracuse, N. Y.

DOORS AND SHUTTERS, FIRE

American Sheet Metal Works, New Orleans.
 Bardes Range & Foundry Co., E. H., Cincinnati.
 Biersach & Niedermeyer Co., Milwaukee.
 Cornell Iron Works, Inc., Long Island City, N. Y.
 Detroit Steel Products Co., Detroit.
 Dusing & Hunt, Inc., Buffalo.
 Edwards Mfg. Co., Inc., Cincinnati.
 Empire Door Co., Inc., New York City.
 Gehri Co., Tacoma, Wash.
 Herrmann & Grace Co., Brooklyn.
 International Steel Co., Evansville, Ind.
 Jamar Co., Walker, Duluth, Minn.
 Kinnear Mfg. Co., Columbus, O.
 Mahon Co., R. C., Detroit.
 Maysteel Products, Inc., Mayville, Wis.
 Merchant & Evans Co., Philadelphia.
 Mesker & Co., Geo. L., Evansville, Ind.
 Meyer Manufacturing Co., Detroit.
 Moeschl-Edwards Corrugating Co., Inc., Cincinnati.
 Perkinson & Brown, Chicago.
 Richards-Wilcox Mfg. Co., Aurora, Ill.
 Richmond Fireproof Door Co., Richmond, Tenn.
 Saino Mfg. Co., Inc., F. L., Memphis, Tenn.
 Syracuse Fire Door Corp., Syracuse, N. Y.
 Western Wire & Iron Works, Inc., Chicago.
 Willis Steel Corporation, Galesburg, Ill.

DRAFT GAGES

See Gages, Draft

DRAFT REGULATORS

See Regulators, Furnace Draft, Mechanical

DRILLS, ELECTRIC, PORTABLE

Albertson & Co., Inc., Sioux City, Iowa.
 • Black & Decker Mfg. Co., Towson, Md.
 Buckeye Portable Tool Co., Dayton, O.
 Chicago Pneumatic Tool Co., New York City.
 Cincinnati Electrical Tool Co., Cincinnati.
 Clark, Jr., Electric Co., Jas., Louisville, Ky.
 Duro Metal Products Co., Chicago.
 • Independent Pneumatic Tool Co., Chicago.
 Keller Tool Company, Grand Haven, Mich. (Pneumatic).
 Mall Tool Co., Chicago.
 Millers Falls Co., Greenfield, Mass.
 Misener Mfg. Co., Inc., Syracuse, N. Y.
 Paramount Products Co., New York City.
 Signal Electric Mfg. Co., Menominee, Mich.
 • Skilsaw, Inc., Chicago.
 Snap-On Tools Corp., Kenosha, Wis.
 Speedway Mfg. Co., Cicero, Ill.
 • Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.
 Syntron Co., Homer City, Pa.
 United States Electrical Tool Co., Cincinnati.
 Van Dorn Electric Tool Co., Towson, Md.
 Willy's Carbide Tool Co., Detroit.
 • Wodack Electric Tool Corp., Chicago. (Combination Hammer and Drill)
 York Electric and Machine Company, York, Pa.

DRIVE CLEATS

See Connectors, Metal, for Metal Ducts

DRIVES, STOKER

Butler Street Foundry & Iron Co., Chicago.
 Davy Fuel & Supply Co., Stoker Div., Detroit.
 Malco Gear Co., Dolton, Ill.
 Merkle-Korff Gear Co., Chicago.
 Independent Pneumatic Tool Co., Chicago.
 Stokerunit Corp., Milwaukee.

DUCT CONNECTIONS

See Connections, Duct, Flexible

DUCT INSULATION

See Insulation, Duct

DUCT TURNING VANES

See Vanes, Duct Turning

DUCTS AND DUCT FITTINGS, PREFABRICATED

Acer & Whedon, Inc., Medina, N. Y.
 Acme Tin Plate & Roofing Supply Co., Philadelphia.
 Adelta Manufacturing Co., Philadelphia.
 Champion Furnace Pipe Co., Peoria, Ill.
 Chandler Co., Cedar Rapids, Ia.
 • Char-Gale Mfg. Co., Minneapolis.
 Chicago Furnace Supply Co., Chicago.
 Cincinnati Sheet Metal & Roofing Co., Cincinnati.
 Corbman Bros., Inc., Philadelphia.
 Excelsior Steel Furnace Co., Chicago.
 Excelsior Stove & Mfg. Co., Quincy, Ill.
 Gehri Co., Tacoma, Wash.
 • General Heating Products Co., Minneapolis.
 Gray Metal Products, Inc., Rochester, N. Y.
 • Henry Furnace Co., Medina, O.
 Howes-Woods Co., Cambridge, Mass.
 Huwer Heating Corp., Detroit.
 • International Heater Co., Utica, N. Y.
 Jacobs Co., B. & J., Cincinnati.
 Lamneck Products, Inc., Middletown, O.
 Made-Rite Furnace Pipe & Fittings Co., Newport, Ky.
 • Meyer & Bro. Co., F., Peoria, Ill.
 • Milcor Steel Co., Milwaukee.
 Moncrief Furnace Co., Atlanta, Ga.
 • Mueller Furnace Co., L. J., Milwaukee.
 Richmond Radiator Co., New York City.
 Sioux Steel Co., Sioux Falls, S. D.
 Schecter Brothers Co., Philadelphia.
 Smith-Raymond Co., Columbus, Ga.
 Standard Furnace & Supply Co., Omaha, Nebr.
 Tri-State Heating Supply Co., Fort Wayne, Ind.
 • United States Register Co., Battle Creek, Mich.
 • Waterman-Waterbury Co., Minneapolis.
 • Williamson Heater Co., Cincinnati.

DUCTS, PREFABRICATED, NOT METAL

Carey Mfg. Co., Philp, Lockland, Cincinnati, O.
 Detroit Gasket & Mfg. Co., Detroit.
 DuPont de Nemours & Co., Inc., E. I., Wilmington, Del.
 Dutton Asbestos & Supply Co., 532 Natoma St., San Francisco. (Pre-insulated).
 Jacobs Co., B. & J., Cincinnati, O.
 Knight, Maurice A., Akron, O. (Acid fumes, stone ware).
 Lumm Co., A. H., Toledo, Ohio.
 • Sall-Mountain Co., Chicago.
 Smith-Raymond Co., Columbus, Ga.
 United States Rubber Co., New York City.

DUST COLLECTORS

See Collectors, Dust

• Advertisement in this issue. See Index to Advertisers, page 324.

EAVES TROUGH FITTINGS AND ACCESSORIES

See Fittings and Accessories, Eaves Trough and Gutter

EAVES TROUGH AND GUTTERS

- American Rolling Mill Co., Middletown, O. (Stainless)
- American Sheet Metal Works, New Orleans.
- Ames Co., W. R., San Francisco.
- Barnes Metal Products Co., Chicago.
- Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.
- Berger Bros. Co., Philadelphia.
- Berger Mfg. Div. of Republic Steel Corp., Canton, O.
- Biersach & Niedermeyer Co., Milwaukee.
- Braden Mfg. Co., Terre Haute, Ind.
- Bridgesburg Foundry Co., Philadelphia.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Chicago Metal Mfg. Co., Chicago.
- Cincinnati Sheet Metal & Roofing Co., Cincinnati.
- Downs-Smith Brass & Copper Co., New York City.
- Edwards Mfg. Co., Inc., Cincinnati.
- Globe Iron Roofing & Corrugating Co., Newport, Ky.
- Herbert & Sons, T. L., Nashville, Tenn.
- Hussey & Co., C. G., Pittsburgh.
- Klauser Mfg. Co., Dubuque, Ia.
- La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
- Lamb & Ritchie Co., Cambridge, Mass.
- Ledkote Products Co., Long Island City, N. Y.
- Lyman Co., H. B., Southampton, Mass.
- Lyon, Conklin & Co., Inc., Baltimore.
- Miller Steel Co., Milwaukee. (Square Hanging).
- Miller & Doing, Brooklyn.
- New Delphos Manufacturing Co., Delphos, O.
- Northern Furnace & Supply Co., Billings, Mont.
- Osborn Co., J. M. & L. A., Cleveland.
- Pittsburgh Plate Glass Co., Pittsburgh.
- Reeves Steel & Mfg. Co., Dover, O.
- Riggin Metal Products, Kankakee, Ill.
- Ryniker Steel Products Co., Billings, Mont.
- Saint Paul Corrugating Co., St. Paul, Minn.
- Schechter Brothers Co., Philadelphia.
- Schoedinger, F. O., Columbus, O.
- Sheet Metal Mfg. Co., Inc., Brooklyn.
- Sheet Metal Products Co., Peoria, Ill.
- Sioux Steel Co., Sioux Falls, S. D.
- Southern States Iron Roofing Co., Savannah, Ga.
- Standard Furnace & Supply Co., Omaha, Nebr.
- Tiffin Eaves Trough Clamp Co., Tiffin, O.
- Van Noorden Co., E., Boston.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Williams-Wallace Co., San Francisco.
- Woolwine Metal Products Co., Los Angeles.
- York Corrugating Co., York, Pa.

ELBOW MACHINES

See Machines, Elbow

ELBOWS, BLOW PIPE

See Fittings, Blow Pipe

ELBOWS, CONDUCTOR

See Fittings and Accessories, Conductor

ELBOWS, FURNACE PIPE

See Fittings and Accessories, Furnace Pipe

ELECTRIC WELDERS

See Welders, Arc, Spot

ELECTRODES, ARC WELDING

- Air Reduction Sales Co., New York City.
- Allegheny Ludlum Steel Corp., Brackenridge, Pa.
- Allied Weld-Craft, Inc., Indianapolis.
- Aluminum Co. of America, Pittsburgh.
- American Agile Corporation, Cleveland.
- American Brass Co., Waterbury, Conn.
- American Steel & Wire Co., Cleveland.
- Arcos Corporation, Philadelphia.
- Atlantic Steel Co., Atlanta, Ga.
- Carlin Co., Anthony, Cleveland.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Chicago Steel & Wire Co., Chicago.
- Ergolyte Manufacturing Co., Philadelphia.
- Electric Arc, Inc., Newark, N. J.
- Eutectic Welding Alloys Co., New York City.
- General Electric Co., Schenectady, N. Y.
- Harnischfeger Corp., Milwaukee.
- Hobart Brothers Co., Troy, O.
- Hollup Corp. Div., National Cylinder Gas Co., Chicago.
- Laclede Steel Co., St. Louis.
- Lincoln Electric Co., Cleveland.
- Marquette Mfg. Co., Inc., Minneapolis.
- Maurath, Inc., Cleveland.
- McKay Co., York, Pa.
- Metal & Thermit Corp., New York City.
- National Carbon Company, Inc., New York City.
- National Cylinder Gas Co., Chicago.
- Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
- Torchweld Equipment Div., National Cylinder Gas Co., Chicago.
- Universal Power Corporation, Cleveland.
- Welding Apparatus Co., Chicago.

Westinghouse Electric & Mfg. Co., East Pittsburgh.
Wilson Welder & Metals Co., Inc., New York City.

ENAMELS & LACQUERS

- Acme White Lead & Color Works, Detroit.
- Acorn Refining Co., Cleveland.
- American-Marietta Co., Chicago.
- Baer Brothers, New York City.
- Blue Ridge Talc Co., Inc., Henry, Va.
- Cordo Chemical Corp., Norwalk, Conn.
- Debevoise Co., Brooklyn. (Enamels)
- Detroit Graphite Co., Detroit.
- Devoo & Reynolds Co., Inc., New York City.
- Dragert Co., C. H., Inc., Brooklyn.
- du Pont de Nemours & Co., E. I., Wilmington, Del.
- Ferro Enamel Corporation, Cleveland.
- Glidden Co., The, Cleveland.
- Hague & Co., Inc., Alfred, Brooklyn.
- Hilo Varnish Corp., Brooklyn.
- Horn Co., A. C., Long Island City, N. Y.
- Inter-Coastal Paint Co., East St. Louis, Ill.
- Krehbiel Co., J. H., Chicago.
- Maas & Waldstein Co., Newark, N. J.
- O'Brien Varnish Co., South Bend, Ind.
- Pittsburgh Plate Glass Co., Pittsburgh.
- Quigley Co., Inc., New York City.
- Roxalin Flexible Finishes, Inc., Elizabeth, N. J.
- Sanvin Chemical Products Co., Moline, Ill.
- Sherwin-Williams Co., Cleveland.
- Sonneborn Sons, Inc., L., New York City.
- Thompson & Co., Oakmont (Pittsburgh Dist.), Pa.
- Tropical Paint & Oil Co., Cleveland. (Enamel)
- U. S. Gutta Percha Paint Co., Providence, R. I.
- Walles Dove-Hermiston Corp., Westfield, N. J.
- Wattenamel Co., Summit, Ill.
- Wilbur & Williams, Boston, Mass.
- Wilhelm Co., A., Reading, Pa.
- Zapon Div., Atlas Powder Co., North Chicago, Ill.

EXHAUSTERS, WELDING FUME

- American Machine Products Co., Marshalltown, Ia.
- Belanger Fan & Blower Co., Detroit.
- Belco Exhaust Fan Mfg. Co., St. Louis.
- Champion Blower & Forge Co., Lancaster, Pa.
- Chelsea Fan & Blower Co., Irvington, N. J.
- Chicago Pneumatic Tool Co., New York City.
- Coppus Engineering Corp., Worcester, Mass.
- Day Co., Minneapolis.
- Despatch Oven Co., Minneapolis.
- Dynamic Air Engineering, Inc., Los Angeles.
- General Blower Co., Chicago, Ill.
- Kirk & Blum Mfg. Co., Cincinnati, O.
- Klee Co., George B., Cincinnati.
- Ruemelin Mfg. Co., Milwaukee.
- Sawyer Electrical Mfg. Co., Los Angeles.
- Torit Manufacturing Co., St. Paul, Minn.
- Utility Appliance Corporation, Los Angeles.
- Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.
- Whiting Corporation, Harvey, Ill.
- Wind-Way Fan & Ventilator Co., Inc., New Orleans, La.

EXPANSION BOLTS

See Bolts, Expansion

FACES, COLD AIR, METAL

- A-J Manufacturing Co., Kansas City, Mo.
- Air Control Products, Inc., Coopersville, Mich.
- American Foundry & Furnace Co., Bloomington, Ill.
- Auer Register Co., Cleveland.
- Best Register Co., Milwaukee, Wis.
- Diamond Manufacturing Co., Wyoming, Pa.
- Hart & Cooley Manufacturing Co., Holland, Mich.
- Hendrick Manufacturing Co., Carbondale, Pa.
- Independent Register Co., Cleveland, O.
- Mundt & Sons, Charles, Jersey City, N. J.
- Rock Island Register Co., Rock Island, Ill.
- Schoedinger, F. O., Columbus, O.
- Stewart Manufacturing Co., Bloomfield, N. J.
- Tuttle & Bailey, Inc., New Britain, Conn.
- United States Register Co., Battle Creek, Mich.
- Western Wire & Iron Works, Inc., Chicago.

FACES, COLD AIR, WOOD

- Antigo Bldg. Supply Co., Antigo, Wis.
- Eaglesfield Ventilator Co., Indianapolis.
- Garber Lumber & Construction Co., Strasburg, O.
- Lockjoint Wood Products Co., Wichita, Kans.
- Marsh Lumber Co., Inc., Dover, O.
- McClure Builders' Supply Co., East Palestine, O.
- United States Register Co., Battle Creek, Mich.

FAN—FILTER UNITS, PROPELLER

(Separate conversion unit for warm air furnaces)

- Air Controls, Inc., Cleveland.
- Mellish & Murray Co., Chicago.
- Peerless Electric Co., Warren, O.
- Utility Appliance Corporation, Los Angeles.
- Wayne Automatic Relay Co., Fort Wayne, Ind.

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FAN HOUSINGS

See Housings, Fan

FANS, AXIAL FLOW

- Aerovent Fan Co., Piqua, O.
- Bahnsen Co., Winston Salem, Ohio.
- Buffalo Forge Co., Buffalo, N. Y.
- Chelsea Fan & Blower Co., Inc., Irvington, N. J.
- DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
- Dynamic Air Engineering, Inc., Los Angeles, Calif.
- Ilg Electric Ventilating Co., Chicago.
- International Engineering, Inc., Dayton, O.
- LaDel Conveyor & Mfg. Co., New Philadelphia, O.
- Propellair, Inc., Springfield, O.
- South Bend Air Products Corp., South Bend, Ind.
- Sturtevant Co., B. F., Boston, Mass.
- Wing Mfg. Co., L. J., New York City.

FANS, BOOSTER, COLD AIR RETURN

- A-C Mfg. Co., Pontiac, Ill.
- Advance Aluminum Castings Corp., Chicago.
- Air Conditioning Products Co., Detroit.
- Aire-Folle Fan & Blower Co., Detroit.
- Bern's Specialty Mfg. Co., Chicago.
- Brumme Mfg. Co., Bloomington, Ill.
- Cary Mfg. Co., Waupaca, Wis.
- Economy Electric Mfg. Co., Cicero, Ill.
- General Blower Co., Inc., Philadelphia.
- International Engineering, Inc., Dayton, O.
- La-Del Conveyor & Mfg. Co., New Philadelphia, O.
- Martin Fan & Blower Co., Chicago.
- Mauer Engineering, Evanston, Ill.
- Midwestern Supply Co., Bloomington, Ill.
- Peerless Electric Co., Warren, O.
- Propellair, Inc., Springfield, O.
- Roan Mfg. Co., Racine, Wis.
- Semco Mfg. Co., Nashville, Tenn.
- Universal Blower Co., Birmingham, Mich.
- Utility Appliance Corporation, Los Angeles.

FANS, BOOSTER, ONE-PIPE WARM AIR

- Advance Aluminum Castings Corp., Chicago.
- Air Conditioning Products Co., Detroit.
- Aire-Folle Fan & Blower Co., Detroit.
- American Foundry & Furnace Co., Bloomington, Ill.
- Brumme Mfg. Co., Bloomington, Ill.
- Dual-Air Fan Corporation, Chicago.
- Economy Electric Mfg. Co., Cicero, Ill.
- Martin Fan & Blower Co., Chicago.
- Mauer Engineering, Evanston, Ill.
- Midwestern Supply Co., Chicago.
- Mueller Furnace Co., L. J., Milwaukee.
- Universal Blower Co., Birmingham, Mich.
- Victor Electric Products, Inc., Cincinnati.

FANS, FURNACE, PROPELLER TYPE

(Complete with mounting for installation in cold air return)

- Air Controls, Inc., Cleveland.
- Belanger Fan & Blower Co., Detroit.
- Brumme Mfg. Co., Bloomington, Ill.
- Century Fan & Ventilator Co., New York City.
- Dual-Air Fan Corporation, Chicago.
- Ilg Electric Ventilating Co., Chicago.
- International Engineering, Inc., Dayton, O.
- Johnston Co., Wm. W., Dayton, O.
- La-Del Conveyor & Mfg. Co., New Philadelphia, O.
- Meier Electric & Machine Co., Indianapolis.
- Midwestern Supply Co., Bloomington, Ill.
- Peerless Electric Co., Warren, O.
- Propellair, Inc., Springfield, O.
- Semco Mfg. Co., Nashville, Tenn.
- Trade-Wind Motor Fans, Inc., Los Angeles.
- Utility Appliance Corporation, Los Angeles.

FANS, KITCHEN EXHAUST

- Aire-Folle Fan & Blower Co., Detroit.
- Airmaster Corp., Chicago.
- American Blower Corp., Detroit.
- American Coolair Corp., Jacksonville, Fla.
- Arex Co., Chicago.
- Barrett Engineers, Cleveland Heights, O.
- Beckett & Co., Thomas, Dallas, Tex.
- Belanger Fan & Blower Co., Detroit.
- Bern's Specialty Mfg. Co., Chicago.
- Bishop & Babcock Mfg. Co., Cleveland.
- Buffalo Forge Co., Buffalo.
- C & H Air Conditioning Fan Co., Inc., Atlanta, Ga.
- Champion Blower & Forge Co., Lancaster, Pa.
- Chelsea Fan & Blower Co., Inc., Irvington, N. J.
- Circulators & Devices Mfg. Corp., New York City.
- Clarage Fan Co., Kalamazoo, Mich.
- Dallas Engineering Co., Inc., Dallas, Tex.
- Diehl Mfg. Co., Somerville, N. J.
- Dual-Air Fan Corporation, Chicago.
- Dynamic Air Engineering, Inc., Los Angeles.
- Economy Electric Mfg. Co., Cicero, Ill.
- Electrovent Corp., Detroit.

- Electrovent Fan & Mfg. Co., Chicago.
- Emerson Electric Mfg. Co., St. Louis.
- Garden City Fan Co., Chicago.
- Hirschman Co., Inc., W. F., Buffalo.
- Hunter Fan & Ventilating Co., Memphis, Tenn.
- Ilg Electric Ventilating Co., Chicago.
- International Engineering, Inc., Dayton, O.
- King Ventilating Co., Owatonna, Minn.
- Marathon Electric Mfg. Corp., Wausau, Wis.
- Martin Fan & Blower Co., Chicago.
- Meyer Manufacturing Co., Detroit.
- Myers Electric Co., Pittsburgh.
- New York Blower Co., Chicago.
- Peerless Electric Co., Warren, O.
- Propellair, Inc., Springfield, O.
- Pryne & Co., Inc., Los Angeles, Calif.
- Reed Unit-Fans, Inc., New Orleans, La.
- Reynolds Electric Company, Chicago.
- Roan Mfg. Co., Racine, Wis.
- Roto-Beam Div., Peerless of America, Inc., Chicago.
- Semco Mfg. Co., Nashville, Tenn.
- Shreveport Engineering Co., Inc., Shreveport, La.
- Skinner Heating & Vent. Co., Heater Div. of St. Louis Blow Pipe and Heater Co., Inc., St. Louis.
- Smith Manufacturing Company, Inc., F. A., Rochester, N. Y.
- Sturtevant Co., B. F., Hyde Park, Boston.
- Trane Company, LaCrosse, Wis.
- Universal Blower Co., Birmingham, Mich.
- U. S. Air Conditioning Corp., Minneapolis.
- Victor Electric Products, Inc., Cincinnati.
- Ward Mfg. Co., Plymouth, Mich.
- Western Blower Co., Seattle, Wash.
- Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

FANS, NIGHT AIR COOLING, COMPLETE UNIT

- Air Controls, Inc., Cleveland.
- Aire-Folle Fan & Blower Co., Detroit.
- Airmaster Corp., Chicago.
- Allen Corporation, Detroit.
- American Blower Corp., Detroit.
- American Coolair Corp., Jacksonville, Fla.
- Associated Southern Industries, Memphis, Tenn.
- Barrett Engineers, Cleveland Heights, O.
- Beckett & Co., Thomas, Dallas, Tex.
- Belanger Fan & Blower Co., Detroit.
- Belco Exhaust Fan Mfg. Co., St. Louis.
- Bern's Specialty Mfg. Co., Chicago.
- Buffalo Forge Co., Buffalo.
- C & H Air Conditioning Fan Co., Inc., Atlanta, Ga.
- Chelsea Fan & Blower Co., Inc., Irvington, N. J.
- Circulators & Devices Mfg. Corp., New York City.
- Dallas Engineering Co., Inc., Dallas, Tex.
- Diehl Mfg. Co., Somerville, N. J.
- Dual-Air Fan Corporation, Chicago.
- Earl Company, Warren, Houston, Tex.
- Economy Electric Mfg. Co., Cicero, Ill.
- Electrovent Fan & Mfg. Co., Chicago.
- Emerson Electric Mfg. Co., St. Louis.
- Fresh'nd-Aire Co., Chicago.
- General Blower Co., Inc., Philadelphia.
- Hartzell Propeller Fan Co., Piqua, O.
- Hirschman Co., Inc., W. F., Buffalo.
- Hunter Fan & Ventilating Co., Memphis, Tenn.
- Ilg Electric Ventilating Co., Chicago.
- International Engineering, Inc., Dayton, O.
- Jaden Manufacturing Co., Hastings, Nebr.
- Jamieson Mfg. Co., Dallas, Tex.
- Johnson Fan & Blower Corp., Chicago.
- Jordan & Co., Paul R., Indianapolis.
- Kelley Mfg. Co., Houston, Tex.
- King Ventilating Co., Owatonna, Minn.
- Lau Blower Co., Dayton, O.
- Marathon Electric Mfg. Corp., Wausau, Wis.
- Martin Fan & Blower Co., Chicago.
- Meier Electric & Machine Co., Indianapolis.
- Murray Co., Dallas, Tex.
- Nelson Corporation, Herman, Moline, Ill.
- New York Blower Co., Chicago.
- Palmer Manufacturing Corp., Phoenix, Ariz.
- Peerless Electric Co., Warren, O.
- Propellair, Inc., Springfield, O.
- Reed Unit-Fans, Inc., New Orleans, La.
- Reynolds Electric Co., Chicago.
- Roto-Beam Div., Peerless of America, Chicago.
- Schwitzer-Cummins Co., Indianapolis.
- Shreveport Engineering Co., Inc., Shreveport, La.
- Skinner Heating & Ventilating Co., Heater Div. of St. Louis Blow Pipe and Heater Co., Inc., St. Louis.
- South Bend Air Products, Inc., South Bend, Ind.
- Sturtevant Co., B. F., Hyde Park, Boston.
- Universal Blower Co., Birmingham, Mich.
- U. S. Air Conditioning Corp., Minneapolis.
- Utility Appliance Corporation, Los Angeles.
- Victor Electric Products, Inc., Cincinnati.
- Viking Air Conditioning Corp., Cleveland.
- Vulcan Metal Products Co., Birmingham, Ala.
- Ward Co., Edgar T., River Forest, Ill.
- Western Blower Co., Seattle, Wash.
- Wind-Way Fan & Ventilating Co., Inc., New Orleans.
- Wood Industries, Inc., Gar, Detroit.

● Advertisement in this issue. See Index to Advertisers, page 324.

FANS, VENTILATING, PROPELLER TYPE

(Capacity 4,000 c.f.m. up)

- Aerovent Fan Co., Piqua, O.
- Air Controls, Inc., Cleveland.
- Aire-Folle Fan & Blower Co., Detroit.
- Airmaster Corp., Chicago.
- Allen Corp., Detroit.
- American Blower Corp., Detroit.
- American Coolair Corp., Jacksonville, Fla.
- Arex Co., Chicago.
- Bahnson Co., Winston-Salem, N. C.
- Barrett Engineers, Cleveland Heights, O.
- Bayley Blower Co., Milwaukee.
- Beckett & Co., Thomas, Dallas, Tex.
- Belanger Fan & Blower Co., Detroit.
- Belco Exhaust Fan Mfg. Co., St. Louis.
- Bern's Specialty Mfg. Co., Chicago.
- Bishop & Babcock Mfg. Co., Cleveland.
- Buffalo Forge Co., Buffalo.
- C. & H. Air Conditioning Fan Co., Inc., Atlanta, Ga.
- Campbell Heating Company, E. K., Kansas City, Mo.
- Century Fan & Ventilator Co., New York City.
- Champion Blower & Forge Co., Lancaster, Pa.
- Chelsea Fan & Blower Co., Inc., Irvington, N. J.
- Circulators & Devices Mfg. Corp., New York City.
- Clarage Fan Co., Kalamazoo, Mich.
- Coppus Engineering Corporation, Worcester, Mass.
- Dallas Eng Co., Inc., Dallas, Tex.
- De Bothezat Fans Division, American Machine & Metals, Inc., East Moline, Ill.
- Diehl Mfg. Co., Somerville, N. J.
- Dual-Air Fan Corporation, Chicago.
- Duriron Co., Inc., Dayton, O. (Acid Resisting).
- Dynamic Air Engineering, Inc., Los Angeles.
- Earl Company, Warren, Houston, Tex.
- Eclipse Air Brush Co., Inc., Newark, N. J.
- Economy Electric Mfg. Co., Cicero, Ill.
- Electrovent Fan & Mfg. Co., Chicago.
- Emerson Electric Mfg. Co., St. Louis.
- Fresh'nd-Aire Co., Chicago.
- Garden City Fan Co., Chicago.
- General Blower Co., Chicago.
- General Electric Co., Bloomfield, N. J.
- Goettl Bros., Phoenix, Ariz.
- Grand Rapids Blow Pipe and Dust Arrester Co., Grand Rapids, Michigan.
- Guth Company, Edwin F., St. Louis.
- Hartzell Propeller Fan Co., Piqua, O.
- Hirschman Co., Inc., W. F., Buffalo.
- Hunter Fan & Ventilating Co., Memphis, Tenn.
- Ilg Electric Ventilating Co., Chicago.
- International Engineering, Inc., Dayton, O.
- Johnson Fan & Blower Corp., Chicago.
- Johnston & Co., Wm. W., Dayton, O.
- Jordan & Co., Paul R., Indianapolis.
- Kelley Manufacturing Co., Houston, Texas.
- King Ventilating Co., Owatonna, Minn.
- Kisco Company, Inc., St. Louis.
- Klee Co., George B., Cincinnati.
- La-Del Conveyor & Mfg. Co., New Philadelphia, O.
- Lau Blower Co., Dayton, O.
- Marathon Electric Mfg. Corp., Wausau, Wis.
- Martin Fan & Blower Co., Chicago.
- McCord Corporation, Detroit.
- Meier Electric & Machine Co., Indianapolis.
- Mountain States Equipment Co., Denver, Colo.
- Myers Electric Co., Pittsburgh.
- Nelson Corporation, Herman, Moline, Ill.
- New York Blower Co., Chicago.
- Palmer Manufacturing Corp., Phoenix, Ariz.
- Peerless Electric Co., Warren, O.
- Perkins & Son, Inc., B. F., Holyoke, Mass.
- Phelps Mfg. Co., Little Rock, Ark.
- Propellair, Inc., Springfield, O.
- Reed Unit-Fans, Inc., New Orleans, La.
- Reynolds Electric Company, Chicago.
- Roto-Beam Div., Peerless of America, Inc., Chicago.
- Schwitzer-Cummins Co., Indianapolis.
- Semco Mfg. Co., Nashville, Tenn.
- Shreveport Engineering Co., Inc., Shreveport, La.
- Signal Electric Mfg. Co., Menominee, Mich.
- Skinner Heating & Ventilating Co., Heater Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis.
- South Bend Air Products, Inc., South Bend, Ind.
- Steamaire Co., Cincinnati.
- Sturtevant Co., B. F., Hyde Park, Boston.
- Trane Company, La Crosse, Wis.
- Truffo Fan Co., Harmony, Pa.
- U. S. Air Conditioning Corp., Minneapolis.
- Utility Appliance Corporation, Los Angeles.
- Viking Air Conditioning Corp., Cleveland.
- Ward Co., Inc., Edgar T., River Forest, Ill.
- Ward Mfg. Co., Plymouth, Mich.
- Water Cooling Equipment Corp., St. Louis.
- Western Blower Co., Seattle, Wash.
- Western Engineering & Mfg. Co., Los Angeles.
- Wind-Way Fan & Ventilating Co., Inc., New Orleans.
- Wing Mfg. Co., L. J., New York City.

FANS, WINDOW VENTILATING

- Air Conditioning Products Co., Detroit.
- Air Controls, Inc., Cleveland.
- Airgard Manufacturing Co., Chicago.
- Airmaster Corp., Chicago.
- American Blower Corporation, Detroit.
- American Coolair Corp., Jacksonville, Fla.
- American Metal Products Co., Fort Worth, Tex.
- Beckett & Co., Thomas, Dallas, Tex.
- Bern's Specialty Mfg. Co., Chicago.
- Buffalo Forge Co., Buffalo.
- Champion Blower & Forge Co., Lancaster, Pa.
- Chelsea Fan & Blower Co., Inc., Irvington, N. J.
- Clarage Fan Co., Kalamazoo, Mich.
- Dallas Engineering Co., Inc., Dallas, Tex.
- Diehl Mfg. Company, Elizabethport, N. J.
- Dual-Air Fan Corporation, Chicago.
- Earl Company, Warren, Houston, Tex.
- Electrovent Fan & Manufacturing Co., Chicago.
- Emerson Electric Mfg. Co., St. Louis.
- Fresh'nd-Aire Company, Chicago.
- General Blower Co., Chicago.
- General Blower Company, Inc., Philadelphia.
- Goettl Bros., Phoenix, Ariz.
- Hunter Fan & Ventilating Co., Memphis, Tenn.
- Ilg Electric Ventilating Co., Chicago.
- Lau Blower Co., Dayton, O.
- Meier Electric and Machine Co., Indianapolis.
- National Engineering & Manufacturing Co., Kansas City.
- Nelson Corporation, Herman, Moline, Ill.
- Peerless Electric Co., Warren, O.
- Reed Unit-Fans, Inc., New Orleans, La.
- Schwitzer-Cummins Co., Indianapolis.
- Semco Mfg. Co., Nashville, Tenn.
- Shreveport Engineering Co., Inc., Shreveport, La.
- Sturtevant Co., B. F., Hyde Park, Boston.
- Utility Appliance Corporation, Los Angeles.
- Victor Electric Products, Inc., Cincinnati.
- Viking Air Conditioning Corporation, Cleveland.
- Ward Co., Inc., Edgar T., River Forest, Ill.
- Ward Mfg. Co., Plymouth, Mich.
- Wind-Way Fan & Ventilator Co., Inc., New Orleans.

FASTENINGS, SPRING STEEL

- Shakeproof, Inc., Chicago.
- Tinnerman Products, Inc., Cleveland.

FILTERS, AIR, AUTOMATIC

- Air Stream Filter Corp., St. Louis.
- Air & Refrigeration Corp., New York City.
- American Air Filter Co., Inc., Louisville, Ky.
- Brauer Supply Co., A. G., St. Louis.
- Dollinger Corporation, Rochester, N. Y.
- Dracco Corporation, Cleveland.
- Farr Company, Los Angeles.
- Westinghouse Electric & Mfg. Co., Cleveland (Electrostatic Precipitator).

FILTERS, AIR, UNIT, CLEANABLE

- Air Devices, Inc., New York City.
- Air Filter Engineering Co., Chicago (Galvanized Wire Cloth).
- Air Maze Corp., Cleveland (Metal-Wire Baffles).
- Air Stream Filter Corp., St. Louis.
- American Air Filter Co., Inc., Louisville, Ky. (Steel wool).
- Amirton Co., Inc., 27 Pearl St., New York City.
- Badger Corporation, Milwaukee (Steel wool).
- Brauer Supply Co., A. G., St. Louis.
- Chicago Filter Co., Joliet, Ill.
- Coppus Engineering Corp., Worcester, Mass. (Felt).
- Detroit Lubricator Co., Detroit (Fibre).
- Dollinger Corporation, Rochester, N. Y. (Feltex, Glastex, heat resistant cotton).
- Farr Company, Los Angeles (Metal Screen).
- Filters, Incorporated, Glendale, Calif. (Felt).
- Kauffman Air Conditioning Corp., St. Louis.
- Kaye & McDonald, Inc., West Orange, N. J.
- Kleenaire Corp., Stevens Point, Wis.
- Research Products Corporation, Madison, Wis. (Metal).
- Somers, Inc., H. J., Detroit (Hair Glass).
- Supreme Air Filter Co., New York City.
- Universal Air Filter Corp., Duluth, Minn. (Cellulose).

FILTERS, AIR, UNIT, THROWAWAY

- American Air Filter Co., Inc., Louisville, Ky.
- Amirton Co., Inc., 27 Pearl St., New York City.
- Arweld Manufacturing Co., Inc., Seattle, Wash.
- Badger Corporation, Milwaukee. (Paper).
- Beckett & Co., Thomas, Dallas, Tex. (Aspen wood).
- Blocksom & Company, Michigan City, Ind. (Flame proof curled fibre and hair).
- Chicago Filter Co., Joliet, Ill.
- Detroit Lubricator Co., Detroit (Fibre).
- Dollinger Corporation, Rochester, N. Y. (Feltex, Glastex and heat resistant cotton).
- Gehri Company, Tacoma, Wash. (Viscous).
- Kleenaire Corp., Stevens Point, Wis.
- Owens-Corning Fiberglas Corp., Toledo, O. (Fiberglass).
- Research Products Corp., Madison, Wis. (Expanded flame-proofed kraft fibre).

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Universal Air Filter Corp., Duluth, Minn. (Cellulose).
Wilson & Co., Inc., Chicago.

FIRE BRICK

See Refractories

FIREPOTS

See Repairs, Stove and Furnace

FIRING TOOLS

See Tools, Firing

FITTINGS AND ACCESSORIES, CONDUCTOR

(Elbows, Heads, Hooks, Shoes, Straps, etc.)

- Allred Manufacturing Co., Inc., Indianapolis.
Ames Co., W. R., San Francisco.
Barnes Metal Products Co., Chicago.
• Berger Bros. Co., Philadelphia.
Berger Mfg. Div. of Republic Steel Corp., Canton, O.
Boyd & Co., Inc., Charles P., Philadelphia.
Braden Mfg. Co., Terre Haute, Ind.
Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
Cincinnati Sheet Metal & Roofing Co., Cincinnati.
Crary Mfg. Co., Middleport, O. (Cut-off).
Dieckmann Co., Ferdinand, Cincinnati.
Downs-Smith Brass & Copper Co., New York City.
Edwards Mfg. Co., Inc., Cincinnati.
Globe Iron Roofing & Corrugating Co., Newport, Ky.
Gray Metal Products, Inc., Rochester, N. Y.
• Hussey & Co., C. G., Pittsburgh.
Iwan Bros., South Bend, Ind.
Klauser Mfg. Co., Dubuque, Ia.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
Levow, David, New York City.
Lyon, Conklin & Co., Inc., Baltimore.
Maysteel Products, Inc., Mayville, Wis.
• Milcor Steel Co., Milwaukee.
New Delphos Manufacturing Co., Delphos, Ohio.
Osborn Co., J. M. & B. A., Cleveland.
Rival Strap Corp., New York City (Ornamental Conductor Straps).
Royal-Apex Mfg. Corp., Brooklyn.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger, F. O., Columbus, O.
Sheet Metal Mfg. Co., Inc., Brooklyn.
Sheet Metal Products Co., Peoria, Ill.
Stewart Foundry, O. S., Cleveland (Iron Conductor Shoes).
Tiffin Eaves Trough Clamp Co., Tiffin, Ohio.
• United States Register Co., Battle Creek, Mich.
Wheeling Corrugating Co., Wheeling, W. Va.
Williams-Wallace Co., San Francisco.
Woolwine Metal Products Co., Los Angeles.

FITTINGS AND ACCESSORIES, EAVES TROUGH AND GUTTER

(Hangers, Strainers, Miters, Ends, Thimbles, etc.)

- Abbott Mfg. Co., Painesville, O. (Hangers).
American Sheet Metal Works. (Straps).
Ames Co., W. R., San Francisco.
Audubon Wire Cloth Corp., Philadelphia (Strainers).
Barnes Metal Products Co., Chicago.
• Berger Bros. Co., Philadelphia.
Berger Mfg. Div. of Republic Steel Corp., Canton, O.
Bertram Mfg. Co., Chicago.
Boyd & Co., Inc., Charles P., Philadelphia.
Braden Mfg. Co., Terre Haute, Ind.
Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
Cincinnati Sheet Metal & Roofing Co., Cincinnati.
Downs-Smith Brass & Copper Co., New York City.
Eav-Tex Company, Upper Darby, Pa. (Roof Gutter Protection).
Edwards Mfg. Co., Inc., Cincinnati.
Globe Iron Roofing & Corrugating Co., Newport, Ky.
Grand Rapids Wire Products Co., Grand Rapids, Mich.
Gray Metal Products, Inc., Rochester, N. Y.
Herbert & Sons, T. L., Nashville, Tenn.
• Hussey & Co., C. G., Pittsburgh (Copper).
Iwan Brothers, South Bend, Ind.
Juniper Elbow Company, Inc., Middle Village, L. I., N. Y.
Klauser Mfg. Co., Dubuque, Ia.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
Ledkote Products Co., Long Island City, N. Y.
Levow, David, New York City.
Lyon, Conklin & Co., Inc., Baltimore.
• Milcor Steel Co., Milwaukee.
New Delphos Manufacturing Co., Delphos, Ohio.
New Way Products Company, Toledo (Eaves Trough Shield).
Ohio Wire Products Co., Dover, O. (Hangers).
Osborn Co., J. M. & L. A., Cleveland.
Reeves Steel & Mfg. Co., Dover, O.
Royal-Apex Mfg. Corp., Brooklyn.
Ryniker Steel Products Company, Billings, Mont.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger, F. O., Columbus, Ohio.
Sheet Metal Mfg. Co., Inc., Brooklyn.
Sheet Metal Products Co., Peoria, Ill.
Snap-On Mfg. Co., Chicago (Hangers).
Southern States Iron Roofing Co., Savannah, Ga.
Tiffin Eaves Trough Clamp Co., Tiffin, Ohio.

U. S. Cistern Filter Mfg. Co., Bloomington, Ill.
Wade Manufacturing Co., Elgin, Ill. (Roof Drains).
Wheeling Corrugating Co., Wheeling, W. Va.
Williams-Wallace Co., San Francisco.
Woolwine Metal Products Co., Los Angeles.

FITTINGS AND ACCESSORIES, FURNACE PIPE

(Angles, Boots, Elbows, Heads, Joints, Offsets, Tees etc.)

- Acer & Whedon, Inc., Madina, N. Y.
Acme Tin Plate & Roofing Supply Co., Philadelphia.
Adelta Manufacturing Co., Philadelphia.
Arcweld Manufacturing Co., Inc., Seattle, Wash.
Armstrong Furnace Company, Columbus, Ohio.
Bergstrom Mfg. Corp., Neenah, Wis.
Braden Mfg. Co., Terre Haute, Ind.
Campbell Heating Co., Des Moines, Ia.
Cary Mfg. Co., Waupaca, Wis.
Champion Furnace Pipe Co., Peoria, Ill.
• Char-Gale Mfg. Co., Minneapolis.
Cincinnati Sheet Metal & Roofing Co., Cincinnati.
Cincinnati Stamping Co., Cincinnati.
Corbman Bros., Inc., Philadelphia.
Detroit Safety Furnace Pipe Co., Detroit.
Excelsior Steel Furnace Co., Chicago.
Excelsior Stove & Mfg. Co., Quincy, Ill.
Farquhar Furnace Co., Wilmington, O.
Fraser & Johnston Co., San Francisco.
Gray Metal Products, Inc., Rochester, N. Y.
Green Colonial Furnace Co., Des Moines, Ia.
• Henry Furnace Company, Medina, Ohio.
Herbert & Sons, T. L., Nashville, Tenn.
• Homer Furnace & Foundry Corp., Coldwater, Mich.
Howe & Bassett Co., Inc., Rochester, N. Y. (Boots).
Howes-Woods Company, Cambridge, Mass.
• International Heater Co., Utica, N. Y.
International Sales Co., San Francisco.
Juniper Elbow Company, Inc., Middle Village, L. I., N. Y.
Keith Furnace Company, Des Moines, Iowa.
• Krauser-Boyd, Inc., North Tonawanda, N. Y. (Elbows).
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis. (Elbows and pipe only).
Lamneck Products, Inc., Middletown, Ohio.
Lennox Furnace Co., Marshalltown, Ia.
Lyman Co., H. B., Southampton, Mass.
Lyon, Conklin & Co., Inc., Baltimore.
• Majestic Co., Huntington, Ind.
Maple City Furnace Co., Monmouth, Ill.
Marshall Furnace Co., Marshall, Mich.
• Meyer & Bro. Co., F., Peoria, Ill.
• Milcor Steel Co., Milwaukee.
Monarch Furnace Fittings Manufacturers, Chicago.
Montag Stove & Furnace Works, Portland, Ore.
• Mueller Furnace Co., L. J., Milwaukee.
Osborn Co., J. M. & L. A., Cleveland.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
• Payne Furnace & Supply Co., Beverly Hills, Calif.
• Peerless Foundry Co., Indianapolis.
Portland Stove Foundry Co., Portland, Me.
• Premier Furnace Company, Dowagiac, Mich.
Reeves Steel & Mfg. Co., Dover, O.
• Rock Island Register Co., Rock Island, Ill.
Ryniker Steel Products Co., Billings, Mont.
Schechter Brothers Co., Philadelphia.
Schoedinger, F. O., Columbus, Ohio.
Sheet Metal Specialty Co., Pittsburgh.
Sheet Metal Mfg. Co., Inc., Brooklyn.
Sioux Steel Co., Sioux Falls, S. D.
Standard Furnace & Supply Co., Omaha, Nebr.
Stratton & Terstegge Co., Louisville, Ky.
Tiffin Eaves Trough Clamp Co., Tiffin, Ohio.
Tri-State Heating Supply Company, Fort Wayne, Ind.
• United States Register Co., Battle Creek, Mich.
• Waterman-Waterbury Co., Minneapolis.
Waverly Heating Supply Co., Boston.
Wheeling Corrugating Co., Wheeling, W. Va.
• Williamson Heater Co., Cincinnati.

FITTINGS AND ACCESSORIES, SMOKE PIPE

(Draw-bands, Clean-outs, Collars, Tees, etc.)

- Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate & Roofing Supply Co., Philadelphia.
Arcweld Manufacturing Co., Inc., Seattle, Wash.
Armstrong Furnace Company, Columbus, Ohio.
Bardes Range & Foundry Co., E. H., Cincinnati.
Bergstrom Mfg. Corp., Neenah, Wis.
Bieler & Son, L., Long Island City, N. Y.
Braden Mfg. Co., Terre Haute, Ind.
• Brauer Supply Co., A. G., St. Louis.
Cary Mfg. Co., Waupaca, Wis.
Champion Furnace Pipe Co., Peoria, Ill.
• Char-Gale Mfg. Co., Minneapolis.
Cincinnati Sheet Metal & Roofing Co., Cincinnati.
Cincinnati Stamping Co., Cincinnati.
Corbman Bros., Inc., Philadelphia.
Detroit Safety Furnace Pipe Co., Detroit.
Excelsior Steel Furnace Co., Chicago.
Excelsior Stove & Mfg. Co., Quincy, Ill.
Green Colonial Furnace Co., Des Moines, Ia.
• Henry Furnace Company, Medina, Ohio.
Herbert & Sons, T. L., Nashville, Tenn.

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- Homer Furnace & Foundry Corporation, Coldwater, Mich.
- Howes-Woods Company, Cambridge, Mass.
- International Heater Co., Utica, N. Y.
- International Sales Co., San Francisco.
- Juniper Elbow Company, Inc., Middle Village, L. I., N. Y.
- Keith Furnace Company, Des Moines, Ia.
- Kirk & Blum Mfg. Co., Cincinnati.
- La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
- Lamneck Products, Inc., Columbus, Ohio.
- Lennox Furnace Co., Marshalltown, Ia.
- Lyman Co., H. B., Southampton, Mass.
- Lyon, Conklin & Co., Inc., Baltimore.
- Made-Rite Furnace Pipe & Fittings Co., Newport, Ky.
- Majestic Co., Huntington, Ind.
- Maple City Furnace Co., Monmouth, Ill.
- Marshall Furnace Co., Marshall, Mich.
- May-Fleberger Company, Newark, Ohio.
- Meyer & Bro. Co., F., Peoria, Ill.
- Milcor Steel Co., Milwaukee.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Osborn Co., J. M. & L. A., Cleveland.
- Patten Co., J. V., Sycamore, Ill.
- Peacard Co., M. A., Boston.
- Peerless Foundry Co., Indianapolis.
- Portland Stove Foundry Co., Portland, Me.
- Premier Furnace Company, Dowagiac, Mich.
- Reeves Steel & Mfg. Co., Dover, O.
- Rock Island Register Co., Rock Island, Ill.
- Schechter Brothers Co., Philadelphia.
- Schoedinger, F. O., Columbus, O.
- Sheet Metal Mfg. Co., Inc., Brooklyn.
- Sioux Steel Co., Sioux Falls, S. D.
- Skinner Heating & Ventilating Co., Heater Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis.
- Standard Furnace & Supply Co., Omaha, Nebr.
- Stratton & Terstegge Co., Louisville, Ky.
- Tierney Rotor Ventilator Co., Minneapolis.
- Tiffin Eaves Trough Clamp Co., Tiffin, Ohio.
- Tri-State Heating Supply Company, Fort Wayne, Ind.
- United States Register Co., Battle Creek, Mich.
- Waterman-Waterbury Co., Minneapolis.
- Waverly Heating Supply Co., Boston.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Wilder Manufacturing Co., Niles, O.
- Williamson Heater Co., Cincinnati.

FITTINGS, BLOW PIPE

- (Elbows, Flanges, Hangers, Hoods and Sweeps, Joints, Rings, Tubing)
- Allington & Curtis Mfg. Co., Saginaw, Mich.
 - Chicago Metal Mfg. Co., Chicago.
 - Cincinnati Sheet Metal & Roofing Co., Cincinnati.
 - Day Co., Minneapolis.
 - Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
 - Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
 - Kirk & Blum Mfg. Co., Cincinnati (Adjustable Buffing Hoods).
 - Mahon Co., R. C., Detroit.
 - National Metal Fabricators, Chicago.
 - Northern Blower Co., Cleveland.
 - Peters-Dalton, Inc., Detroit.
 - Puhl & Hepper Mfg. Co., Inc., St. Louis.
 - Schmiegel Industries, Detroit.
 - Skinner Heating & Vent. Co., Heater Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis.
 - Tiffin Eaves Trough Clamp Co., Tiffin, Ohio.
 - United States Register Co., Battle Creek, Mich.
 - Western Blower Co., Seattle, Wash.
 - Winkler & Sons, Inc., A. E., Milwaukee.
 - Young & Bertke Co., Cincinnati.

FITTINGS, COPPER TUBE, COMPRESSION

Packless Metal Products Corporation, New Rochelle, N. Y. (self-flaring).

FITTINGS, HUMIDIFIER, WATER LINE

- American Brass Co., Waterbury, Conn.
- Cleveland Humidifier Co., Cleveland.
- Hays Mfg. Co., Erie, Pa.
- McDonnell & Miller, Chicago.
- Maid-O'-Mist, Inc., Chicago.
- Mueller Brass Co., Port Huron, Mich.
- Parker Appliance Co., Cleveland.
- Reichert Float & Mfg. Co., Toledo, O.
- Scovill Mfg. Co., Morency-Buren Div., Sturgis, Mich.
- Skuttell Manufacturing Co., Detroit.
- Streamline Pipe & Fittings Div., Mueller Brass Co., Port Huron, Mich.

FLANGERS

See Machines, Flanging

FLANGES, BLOW PIPE

See Fittings, Blow Pipe

FLASHINGS, ROOF, PATENTED

- Alpha Metals, Inc., Brooklyn.
- American Rolling Mill Co., Middletown, Ohio (Galvanized).
- Barrett Division, Allied Chemical & Die Corporation, New York City (for brick and concrete).

- Berger Mfg. Div. Republic Steel Co., Canton, Ohio.
- Biersach & Niedermeyer Co., Milwaukee.
- Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
- Cheney Metal Products Co., Trenton, N. J.
- Copper Roofs Corporation, Milwaukee.
- Cox Roofing Co., Winston-Salem, N. C.
- Downs-Smith Brass & Copper Co., New York City.
- Eagle-Picher Lead Co., Cincinnati.
- Edwards Mfg. Co., Inc., Cincinnati.
- Figge Mfg. Co., Chicago.
- Flemm Lead Company, Inc., Long Island City, N. Y.
- Hussey & Co., C. G., Pittsburgh.
- Keystone Flashing Company, Philadelphia.
- Majestic Flashing Company, Baltimore.
- Milcor Steel Co., Milwaukee.
- National Lead Company, New York City.
- New Delphos Manufacturing Co., Delphos, Ohio.
- Robertson Co., H. H., Pittsburgh.
- Rochester Lead Works, Inc., Rochester, N. Y.
- Schoedinger, F. O., Columbus, O.
- Simplex Manufacturing Co., Fond du Lac, Wis.
- Van Noorden Co., E., Boston.
- Williams-Wallace Co., San Francisco.
- York Corrugating Co., York, Pa.

FLASHINGS, THROUGH-WALL, PATENTED

- Alpha Metals, Inc., Brooklyn.
- American Brass Co., Waterbury, Conn. (Copper).
- Biersach & Niedermeyer Company, Milwaukee.
- Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
- Cheney Metal Products Co., Trenton, N. J.
- Downs-Smith Brass & Copper Co., Inc., New York City.
- Figge Mfg. Co., Chicago.
- Keystone Flashing Company, Philadelphia.
- Majestic Flashing Company, Baltimore.
- New Delphos Manufacturing Co., Delphos, Ohio.
- Robertson Co., H. H., Pittsburgh.
- ThruBond Flashing Corp., New York City.
- Van Noorden Co., E., Boston.

FLASHINGS, WALL, PATENTED

- Alpha Metals, Inc., Brooklyn.
- Biersach & Niedermeyer Company, Milwaukee.
- Cheney Metal Products Co., Trenton, N. J.
- Copper Roofs Corporation, Milwaukee.
- Figge Mfg. Co., Chicago.
- Keystone Flashing Company, Philadelphia.
- La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
- Majestic Flashing Company, Baltimore.
- Milcor Steel Co., Milwaukee.
- New Delphos Manufacturing Co., Delphos, Ohio.
- Schoedinger, F. O., Columbus, O.
- ThruBond Flashing Corp., New York City.
- Van Noorden Co., E., Boston.
- York Corrugating Co., York, Pa.

FLOOR FURNACES

See Furnaces, Warm Air, Floor

FLUE GAS ANALYZERS

See Analyzers, CO₂, Portable

FLUX, SOLDERING

- Air Reduction Sales Company, New York City (Aluminum).
- Allen Co., Inc., L. B., Chicago (Aluminum, Copper, Gal. Iron, Stainless Steel).
- American Chemical Paint Co., Ambler, Pa.
- American Solder & Flux Co., Philadelphia, Pa.
- Bastian-Blessing Co., Chicago.
- Belmont Smelting & Refining Works, Inc., Brooklyn.
- Benson Co., Inc., Alex R., Hudson, N. Y. (Salts, Pastes for Copper, Galvanized, Stainless).
- Burnley Battery & Mfg. Co., North East, Pa. (Paste, Salts, Solution), (Copper, Galvanized Iron).
- Chase Brass & Copper Co., Incorporated, Waterbury, Conn. (Copper sweat fittings).
- Colonial Alloys Company, Philadelphia (Stainless).
- Diener Mfg. Co., Geo. W., Chicago.
- du Pont de Nemours & Co., E. I., Wilmington, Del. (Copper, Galvanized Iron).
- Eutectic Welding Alloys Co., New York City (Aluminum, Copper, Galvanized Iron, Stainless).
- Farrelloy Company, Inc., Philadelphia.
- Garden City Laboratory, Inc., Chicago.
- Gardiner Metal Co., Chicago.
- Handy & Harman, New York City (Copper, galvanized iron, stainless).
- Hercules Chemical Co., Inc., New York City.
- Johnson Co., Lloyd S., Chicago (Aluminum, stainless steel, copper, galvanized iron).
- Johnson Gas Appliance Co., Cedar Rapids, Iowa.
- Kester Solder Co., Chicago (Viscosiformed Paste, Trichloron Salts, Stainless Steel—Paste and Salts).
- Langsenkamp Co., F. H., Indianapolis (Stainless Steel).
- Lewis Laboratories, Inc., Paul, Milwaukee (Low Tin Content).
- Linde Air Products Co., New York City (Aluminum, copper, galv. iron, stainless).
- Lukens Metal Co., Thos. F., Philadelphia (Copper, Galvanized Iron, Stainless Steel).
- Motex Metal Process Corporation, Detroit.

• Advertisement in this issue. See Index to Advertisers, page 324.

National Cylinder Gas Co., Chicago.
 Nelson Chemical Co., Detroit (For Steel).
 Pfanstiehl Chemical Co., Waukegan, Ill. (Copper, galv. iron, stainless).
 Potomac Mfg. Co., Philadelphia.
 Reiner & Campbell Co., Inc., Elizabeth, N. J.
 • Ruby Chemical Co., Columbus, O. (Liquid and Paste for copper, galv. iron, stainless).
 Scaife Company, Oakmont, Pa.
 Superior Flux Co., Cleveland. (Aluminum, copper, iron, magnesium, stainless).
 Torchweld Equipment Div. National Cylinder Gas Co., Chicago (Aluminum, copper, galv. iron, stainless).
 Torco Products, Inc., Los Angeles.
 Wolfe-Kote Co., Sheboygan, Wis.
 Woodhill Chemical Co., Cleveland.

FRAMING, FOR HOUSING ASSEMBLIES

Dahlstrom Metallic Door Co., Jamestown, N. Y.

FUEL UNITS FOR OIL BURNERS

See Units, Fuel, for Oil Burners

FURNACE BLOWERS

See Blowers, Furnace, Centrifugal

FURNACE-BURNER UNITS

See Furnaces, Warm Air

FURNACE CEMENT

See Cement, Furnace

FURNACE CLEANERS

See Cleaners, Vacuum, Furnace

FURNACE COVERING

See Insulation, Furnace and Pipe

FURNACE LIGHTERS

See Lighters, Furnace

FURNACE LINING

See Refractories

FURNACE PIPE

See Pipe, Furnace

FURNACE PIPE FITTINGS AND ACCESSORIES

See Fittings and Accessories, Furnace Pipe

FURNACE REGULATORS

See Regulators, Furnace Draft, Mechanical and Motors, Damper, Furnace Draft, Electrical

FURNACE REPAIRS

See Repairs, Stove and Furnace

FURNACES, CHIMNEY

- Round Oak Co., Dowagiac, Mich.

FURNACES FOR LARGE BUILDINGS

(800,000 Btu and up)

- Airtherm Manufacturing Co., St. Louis.
- American Furnace Co., St. Louis.
- Chicago Steel Furnace Co., Chicago (Gas or Oil).
- Dravo Corporation, Pittsburgh.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- International Sales Co., San Francisco.
- Jackson & Church Co., Saginaw, Mich.
- Lennox Furnace Co., Marshalltown, Iowa.
- MaGill Foundry and Furnace Works, P. H., Bloomington, Ill.
- Mueller Furnace Company, L. J., Milwaukee.
- National Heater Co., Minneapolis.
- Northwest Stove & Furnace Works, Inc., Portland, Ore.
- Peerless Foundry Co., Inc., Indianapolis.
- Stainless & Steel Products Co., St. Paul, Minn.

FURNACES, SOLDERING

- Aeroll Burner Co., Inc., West New York, N. J.
- Bernz Co., Otto, Rochester, N. Y.
- Burgess Soldering Furnace Co., Columbus, O. (Gasoline).
- Clayton & Lambert Mfg. Co., Dearborn, Mich.
- Diener Mfg. Co., Geo. W., Chicago.
- Eclipse Fuel Engineering Co., Rockford, Ill.
- Floral City Company, Monroe, Mich.
- Hones, Inc., Charles A., Baldwin, N. Y.
- Johnson Gas Appliance Co., Cedar Rapids, Ia.
- Lenk Mfg. Company, Newton Lower Falls, Mass.
- Liquefied Gas Appliance Co., Mars, Pa.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Reiner & Campbell Co., Inc., Elizabeth, N. J.
- Reliable Gas Products Co., Cedar Rapids, Ia.
- Sanders, J. A., Fulton, N. Y.
- Turner Brass Works, Sycamore, Ill.
- Unique Manufacturing Co., Inc., Chicago (Gasoline).
- Vulcan Electric Co., Danvers, Mass.
- Wall Mfg. Supply Co., P. N. S. Pittsburgh.
- Ward Machinery Co., Chicago (Gas).
- Weiss & Co., H., New York City.
- Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

• Advertisement in this issue. See Index to Advertisers, page 824.

FURNACES, WARM AIR, AIR CONDITIONING COAL, CAST IRON

(Complete matched, hand-fired, furnace, fan, filter and humidifier unit)

- Adelta Manufacturing Co., Philadelphia.
- Agricola Furnace Co., Inc., Gadsden, Ala.
- Airtemp Div., Chrysler Corp., Dayton, O.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace & Foundry Co., Milan, Mich.
- American Radiator and Standard Sanitary Corp., Pittsburgh
- Andes Range & Furnace Corp., Geneva, N. Y.
- Bovee Furnace Works, Waterloo, Ia.
- Chandler Co., Cedar Rapids, Ia.
- Excelsior Steel Furnace Co., Chicago.
- Excelsior Stove & Mfg. Co., Quincy, Ill.
- Farris Furnace Company, Springfield, Ill.
- Faultless Heater Corp., Cleveland.
- Forest City Foundries Co., Cleveland.
- Front Rank Furnace Company, Div. Liberty Foundry Co., St. Louis.
- Green Colonial Furnace Co., Des Moines, Ia.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Hart & Crouse Corp., Utica, N. Y.
- Henry Furnace Company, Medina, Ohio.
- Hess-Snyder Co., Massillon, O.
- Homer Furnace & Foundry Corp., Coldwater, Mich.
- Ideal Furnace Co., Detroit.
- International Heater Co., Utica, N. Y.
- Kehm Corporation, Chicago.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Inc., Syracuse, N. Y.
- MaGill Foundry & Furnace Works, P. H., Bloomington, Ill.
- Majestic Co., Huntington, Ind.
- Marshall Furnace Co., Marshall, Mich.
- May-Fieberger Co., Newark, O.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- Mount Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
- Mueller Furnace Co., L. J., Milwaukee.
- Olsen Mfg. Co., C. A., Elyria, O.
- Pittsburgh Furnace Parts Co., Pittsburgh.
- Portland Stove Foundry Co., Portland, Me.
- Premier Furnace Co., Dowagiac, Mich.
- Reynolds Manufacturing Co., Springfield, Mo.
- Robinson Furnace Co., Chicago.
- Rock Island Stove Co., Rock Island, Ill.
- Round Oak Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- Rybolt Heater Co., Ashland, O.
- St. Louis Furnace Manufacturing Co., St. Louis.
- Schill Mfg. Co., Crestline, O.
- Schwab Furnace Co., Milwaukee.
- Security Manufacturing Co., Kansas City, Mo.
- Sioux City Foundry & Boiler Company, Sioux City, Ia.
- Spear Stove & Heater Co., James, Philadelphia.
- Stainless & Steel Products Co., St. Paul, Minn.
- Twentieth Century Heating & Ventilating Co., Akron, O.
- Western Furnaces, Inc., Tacoma, Wash.
- Williamson Heater Co., Cincinnati.
- Wise Furnace Co., Akron, O.
- XXth Century Heating & Ventilating Co., Akron, O.
- York Corporation, York, Pa.

FURNACES, WARM AIR, AIR CONDITIONING, COAL, STEEL

(Complete matched, hand-fired, furnace, fan, filter and humidifier unit)

- Adelta Manufacturing Co., Philadelphia.
- Airtemp Div., Chrysler Corp., Dayton, O.
- American Furnace Co., St. Louis.
- American Radiator and Standard Sanitary Corp., Pittsburgh.
- Andrews Heating Co., Minneapolis.
- Arweld Manufacturing Co., Inc., Seattle, Wash.
- Armstrong Furnace Co., Columbus, O.
- Bard Manufacturing Co., Bryan, Ohio.
- Beck Engineering Combustion Company, St. Louis.
- Bovee Furnace Works, Waterloo, Ia.
- Campbell Heating Co., Des Moines, Ia.
- Campbell Heating Co., E. K., Kansas City, Mo.
- Cleveland Steel Products Corp., Torridheat Div., Cleveland.
- Deshler Foundry & Machine Works, Deshler, Ohio.
- Dowagiac Steel Furnace Company, Dowagiac, Mich.
- Excelsior Steel Furnace Co., Chicago.
- Farquhar Furnace Co., Wilmington, O.
- Faultless Heater Corp., Cleveland.
- Fitzgibbons Boiler Company, Inc., New York City.
- Forest City Foundries Co., Cleveland.
- Front Rank Furnace Company, Div. Liberty Foundry Co., St. Louis.
- Green Colonial Furnace Co., Des Moines, Ia.
- Grossenbacher Furnace Co., St. Louis.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Heatlox Furnaces, Inc., Tacoma, Wash.
- Henry Furnace Company, Medina, Ohio.
- Hess-Snyder Co., Massillon, O.
- Hess Warming & Ventilating Co., Chicago.
- Homer Furnace & Foundry Corp., Coldwater, Mich.

- Ideal Furnace Co., Detroit.
 Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.
 • International Heater Co., Utica, N. Y.
 • Jackson & Church Co., Saginaw, Mich.
 Joliet Heating Corp., Joliet, Ill.
 Keith Furnace Co., Des Moines, Ia.
 Kelsey Heating Co., Inc., Syracuse, N. Y.
 • Koons Furnace Co., Danville, Ill.
 • Leader Iron Works, Inc., Decatur, Ill.
 Lennox Furnace Co., Marshalltown, Ia.
 McPherson Furnace & Supply Co., Portland, Ore. (Also sawdust and wood burning).
 Made-Rite Furnace Pipe & Fittings Co., Newport, Ky.
 • Majestic Co., Huntington, Ind.
 • Marshall Furnace Co., Marshall, Mich.
 • May-Flebege Co., Newark, O.
 • Meyer Furnace Co., Peoria, Ill.
 Montag Stove & Furnace Works, Portland, Ore.
 • Mueller Furnace Co., L. J., Milwaukee.
 National Manufacturing & Engineering Co., Detroit.
 Northwest Stove & Furnace Works, Portland, Ore.
 • Olsen Mfg. Co., C. A., Elyria, O.
 Parker Heating & Manufacturing Co., St. Petersburg, Fla.
 Pennsylvania Furnace & Iron Co., Warren, Pa.
 Perfection Stove Co., Inc., Cleveland.
 Pittsburgh Furnace Parts Co., Pittsburgh.
 Portland Stove Foundry Co., Portland, Me.
 Robinson Furnace Co., Chicago.
 Rosebraugh Co., W. W., Salem, Ore.
 • Round Oak Co., Dowagiac, Mich.
 • Rudy Furnace Co., Dowagiac, Mich.
 • Rybolt Heater Co., Ashland, O.
 St. Louis Furnace Manufacturing Co., St. Louis.
 Sandberg Co., H. J., Portland, Ore.
 Schill Mfg. Co., Crestline, O.
 • Schwab Furnace Co., Milwaukee.
 Skinner Heating & Vent. Co., Heater Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis.
 Smith Heater Co., Peter, Detroit.
 Spencer Heater Division, Williamsport, Pa.
 • Stainless & Steel Products Co., St. Paul, Minn.
 Standard Furnace & Supply Co., Omaha, Nebr.
 Sure Comfort Furnace Co., Berwyn, Ill.
 • Syncromatic Corporation, Milwaukee.
 United States Radiator Corporation, Detroit.
 • Viking Manufacturing Corporation, Dayton, Ohio.
 • Waterman-Waterbury Co., Minneapolis.
 • Williamson Heater Co., Cincinnati.
 York Corporation, York, Pa.

FURNACES, WARM AIR, AIR CONDITIONING, FOR ATTIC INSTALLATION, STEEL

- American Furnace Co., St. Louis (Oil or Gas).
 International Sales Co., San Francisco. (Gas).
 Lennox Furnace Co., Marshalltown, Iowa (Gas).
 • Payne Furnace & Supply Co., Beverly Hills, Calif. (Gas).
 York Corporation, York, Pa.

FURNACES, WARM AIR, AIR CONDITIONING, GAS, CAST IRON

(Complete matched, gas-fired, furnace, fan, filter and humidifier unit)

- Adelta Manufacturing Co., Philadelphia.
 • Airtemp Div., Chrysler Corp., Dayton, O.
 American Foundry & Furnace Co., Bloomington, Ill.
 American Furnace Company, St. Louis.
 American Radiator and Standard Sanitary Corp., Pittsburgh.
 Andrews Heating Company, Minneapolis.
 Bastian-Morley Co., Inc., LaPorte, Ind.
 Beck Engineering Combustion Company, St. Louis.
 • Bryant Heater Co., Cleveland.
 Burke Stoker & Mfg. Co., Chicago.
 Coraire Heater Corporation, Cleveland.
 Delco Appliance Div., General Motors Corp., Rochester, N. Y.
 • Forest City Foundries Co., Cleveland, O.
 Green Colonial Furnace Co., Des Moines, Ia.
 • Henry Furnace Company, Medina, Ohio.
 Hess-Snyder Co., Massillon, O.
 Ideal Furnace Co., Detroit.
 • International Heater Co., Utica, N. Y.
 Moncrief Furnace & Mfg. Co., Dallas, Texas.
 • Mueller Furnace Co., L. J., Milwaukee.
 Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit.
 • Olsen Manufacturing Co., C. A., Elyria, O.
 Pennsylvania Furnace & Iron Co., Warren, Pa.
 • Premier Furnace Co., Dowagiac, Mich.
 • Rudy Furnace Co., Dowagiac, Mich.
 • Rybolt Heater Co., Ashland, O.
 • Schwab Furnace Co., Milwaukee.
 Security Manufacturing Co., Kansas City, Mo.
 Sioux City Foundry and Boiler Company, Sioux City, Ia.
 • Surface Combustion, Toledo, O.
 Thatcher Furnace Co., Garwood, N. J.
 Twentieth Century Heating & Ventilating Co., Akron, O.
 • Viking Mfg. Corp., Dayton, Ohio.
 XXth Century Heating & Ventilating Co., Akron, O.
 • Williamson Heater Co., Cincinnati, O.
 • Wise Furnace Co., Akron, O.
 York Corp., York, Pa.

FURNACES, WARM AIR, AIR CONDITIONING, GAS, STEEL

(Complete matched, gas-fired furnace, fan, filter and humidifier unit)

- Adelta Manufacturing Co., Philadelphia.
 • Airtemp Div., Chrysler Corp., Dayton, O.
 Aladdin Heating Corporation, Oakland, Calif.
 Allied Heating & Air Conditioning Co., Lawndale, Calif.
 American Furnace Company, St. Louis.
 American Radiator and Standard Sanitary Corp., Pittsburgh.
 Andrews Heating Company, Minneapolis.
 Armstrong Furnace Co., Columbus, O.
 Auburn Burner Co., Auburn, Ind.
 Bard Mfg. Co., Bryan, O.
 Beck Engineering Combustion Company, St. Louis.
 • Brown Steel Tank Co., Minneapolis.
 Bryant Corp., C. L., Cleveland.
 Burke Stoker & Mfg. Co., Chicago.
 Campbell Heating Company, Des Moines, Ia.
 Campbell Heating Co., E. K., Kansas City, Mo.
 Chandler Company, Cedar Rapids, Ia.
 • Conco Corporation, Mendota, Ill.
 Dalzen Tool & Manufacturing Co., Detroit.
 Dornback Furnace & Foundry Co., Cleveland.
 • Dowagiac Steel Furnace Co., Dowagiac, Mich.
 Fitzgibbons Boiler Co., Inc., New York City.
 Floral City Company, Monroe, Mich.
 • Forest City Foundries Co., Cleveland.
 Fraser and Johnston Co., San Francisco.
 Gaul Air Conditioner Co., Dayton, Ohio.
 General Electric Company, Bloomfield, N. J.
 General Gas Light Co., Kalamazoo, Mich.
 • Gillen Company, J. L., Dowagiac, Mich.
 Glasby Manufacturing Co., Inc., J. P., Bloomfield, N. J.
 Green Colonial Furnace Co., Des Moines, Ia.
 Grossenbacher Furnace Co., St. Louis.
 • Hall-Neal Furnace Co., Indianapolis, Ind.
 Hammel Radiator Engineering Co., Los Angeles, Cal.
 Heating Equipment Co., San Francisco.
 Heatlox Furnaces, Inc., Tacoma, Wash.
 Hell Co., The, Milwaukee.
 • Henry Furnace Company, Medina, Ohio.
 Hess Warming & Ventilating Co., Chicago.
 Holly Heating & Mfg. Co., So. Pasadena, Calif.
 Huwer Heating Corp., Detroit.
 Ideal Furnace Co., Detroit.
 Independence Stove & Furnace Co., Independence, Mo.
 Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.
 International Sales Co., San Francisco.
 • Jackson & Church Co., Saginaw, Mich.
 Johnston Gas Furnace Corp., North Hollywood, Calif.
 Joliet Heating Corp., Joliet, Ill.
 Kaustine Company, Inc., Perry, N. Y.
 Kehm Corporation, Chicago, Ill.
 Keith Furnace Co., Des Moines, Ia.
 Kent & Co., Inc., J. King, St. Louis.
 Koons Furnace Company, Danville, Ill.
 Leeson Air Conditioning Corporation, Detroit.
 Lennox Furnace Co., Marshalltown, Ia.
 Made-Rite Furnace Pipe & Fittings Co., Newport, Ky.
 • Majestic Co., Huntington, Ind.
 Marlon Furnace Co., Detroit.
 • May-Flebege Co., Newark, O.
 • Mayflower Air-Conditioners, Inc., St. Paul, Minn.
 • Meyer Furnace Co., Peoria, Ill.
 Moncrief Furnace & Mfg. Co., Inc., Dallas, Texas.
 • Morrison Steel Products, Inc., Buffalo.
 • Mueller Furnace Co., L. J., Milwaukee.
 National Manufacturing & Eng. Co., Detroit.
 New Mission Htg. & Vent. Co., San Francisco.
 Northern Furnace & Supply Co., Billings, Mont.
 • Olsen Mfg. Co., C. A., Elyria, O.
 Pacific Gas Heating Co., San Francisco.
 • Palmer Manufacturing Corp., Phoenix, Ariz.
 Parker Heating & Mfg. Co., St. Petersburg, Fla.
 Patten Co., J. V., Sycamore, Ill.
 • Payne Furnace & Supply Co., Beverly Hills, Calif.
 • Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
 Pennsylvania Furnace & Iron Co., Warren, Pa.
 Perfection Stove Co., Cleveland.
 Pernot & Rich, Inc., Los Angeles.
 • Premier Furnace Company, Dowagiac, Mich.
 Reif-Rexoll, Inc., Buffalo.
 Robinson Furnace Co., Chicago.
 • Round Oak Co., Dowagiac, Mich.
 Royal Air Conditioning Equipment Co., Alhambra, Calif.
 • Rudy Furnace Co., Dowagiac, Mich.
 • Rybolt Heater Co., Ashland, O.
 Ryniker Steel Products Company, Billings, Mont.
 St. Louis Furnace Manufacturing Co., St. Louis.
 Schill Mfg. Co., Crestline, O.
 • Schwab Furnace Co., Milwaukee.
 Scott-Newcomb, Inc., St. Louis.
 Security Manufacturing Co., Kansas City, Mo.
 Standard Furnace & Supply Co., Omaha, Nebr.
 United States Radiator Corp., Detroit.
 • Utility Appliance Corporation, Los Angeles. (Butane).
 • Viking Mfg. Corp., Dayton, Ohio.
 • Waterman-Waterbury Co., Minneapolis.

• Advertisement in this issue. See Index to Advertisers, page 324.

- Wayne Oil Burner Co., Fort Wayne, Ind.
- Wheeling Furnace Corporation, Martins Ferry, Ohio.
- Williamson Heater Co., Cincinnati.
- Wood Industries, Inc., Gar, Detroit.

FURNACES, WARM AIR, AIR CONDITIONING, OIL, CAST IRON

(Complete matched, oil-burning furnace, fan, filter and humidifier unit)

- Adelta Manufacturing Co., Philadelphia.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Radiator & Standard Sanitary Corp., Pittsburgh.
- Auto-Heat Corporation, New York City.
- Chandler Co., Cedar Rapids, Ia.
- Coroalre Heater Corporation, Cleveland.
- Excelsior Steel Furnace Co., Chicago.
- International Heater Co., Utica, N. Y.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Inc., Syracuse, N. Y.
- MaGiri Foundry and Furnace Works, P. H., Bloomington, Ill.
- May Oil Burner Corporation, Baltimore.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee.
- Portland Stove Foundry Co., Portland, Me.
- Premier Furnace Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- Rybolt Heater Co., Ashland, Ohio.
- St. Louis Furnace Manufacturing Co., St. Louis.
- Schwab Furnace Co., Milwaukee.
- Sioux City Foundry & Boiler Co., Sioux City, Ia.
- Stainless & Steel Products Co., St. Paul, Minn.
- Standard Furnace & Supply Co., Omaha, Nebr.
- Westwick & Son, Inc., John, Galena, Ill.
- Williams Oil-O-Matic Heating Corporation, Bloomington, Ill.
- Wise Furnace Co., Akron, O.

FURNACES, WARM AIR, AIR CONDITIONING, OIL, STEEL

(Complete matched, stoker-furnace, fan, filter, and humidifier unit)

- Adelta Manufacturing Co., Philadelphia.
- Airtemp Div., Chrysler Corp., Dayton, O.
- Allis-Chalmers Mfg. Co., Milwaukee.
- American Air Conditioning Corp., Sebastopol, Calif.
- American Furnace Co., St. Louis.
- American Radiator & Standard Sanitary Corp., Pittsburgh.
- American Stove Co., Lorain, O.
- Anchor Post Fence Co., Heating Div., Baltimore.
- Andrews Heating Co., Minneapolis.
- Arcweld Manufacturing Co., Inc., Seattle, Wash.
- Armstrong Furnace Co., Columbus, O.
- Auburn Burner Co., Auburn, Ind.
- Auburn Foundry, Inc., Stoker Div., Auburn, Ind.
- Auto-Heat Corporation, New York City.
- Automatic Burner Corporation, Chicago.
- Bard Mfg. Co., Bryan, O.
- Beck Engineering Combustion Company, St. Louis.
- Bovee Furnace Works, Waterloo, Ia.
- Brown Steel Tank Co., Minneapolis.
- Bryant Corp., C. L., Cleveland.
- Campbell Heating Co., Des Moines, Ia.
- Campbell Heating Co., E. K., Kansas City, Mo.
- Cary Manufacturing Co., Waupaca, Wis.
- Century Engineering Corporation, Cedar Rapids, Ia.
- Chandler Co., Cedar Rapids, Ia.
- Chicago Steel Furnace Co., Chicago.
- Cleveland Steel Products Corp., Torridheet Div., Cleveland.
- Conco Corporation, Mendota, Ill.
- Crane Company, Chicago.
- Dalzen Tool & Manufacturing Co., Detroit.
- Delco Appliance Div., General Motors Corp., Rochester, N. Y.
- Deshler Foundry & Machine Works, Deshler, O.
- Des Moines Stove Repair Co., Des Moines, Ia.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.
- Electrol Mfg. Co., Passaic, N. J.
- Evans Corp., George, Moline, Ill.
- Farquhar Furnace Co., Wilmington, O.
- Fitzgibbons Boiler Co., Inc., New York City.
- Floral City Co., Monroe, Mich.
- Forest City Foundries Co., Cleveland, O.
- Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis.
- Gasoroll Mfg. Corp., Genoa City, Wis.
- Gehrl Co., Tacoma, Wash.
- General Electric Co., Bloomfield, N. J.
- General Heating Products Co., Minneapolis.
- Gilbert & Barker Mfg. Co., West Springfield, Mass.
- Gillen Co., J. L., Dowagiac, Mich.
- Glasby Manufacturing Co., Inc., J. P., Bloomfield, N. J.
- Green Colonial Furnace Co., Des Moines, Ia.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Harvey-Whipple, Inc., Springfield, Mass.
- Heatlox Furnaces, Inc., Tacoma, Wash.
- Hell Co., Milwaukee.
- Henry Furnace Co., Medina, O.
- Hess Warming & Ventilating Co., Chicago.
- Hipoint Corp., Bellefontaine, O.
- Homer Furnace & Foundry Corp., Coldwater, Mich.

- Hotentot Co., Inc., Omaha, Nebr.
- Huwer Heating Corp., Detroit.
- Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.
- International Heater Co., Utica, N. Y.
- International Sales Co., San Francisco.
- Interstate Metal Products Co., Inc., Chicago.
- Jackson & Church Co., Saginaw, Mich.
- Joliet Heating Corp., Joliet, Ill.
- Johnson Co., S. T., Oakland, Calif., and Philadelphia.
- Kaustine Company, Inc., Perry, N. Y.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Inc., Syracuse, N. Y.
- Kleen-Heat, Inc., Chicago.
- Koons Furnace Co., Danville, Ill.
- Kresky Mfg. Co., Petaluma, Calif.
- Kruse Co., Indianapolis, Ind.
- Laco Oil Burner Co., Griswold, Ia.
- Lennox Furnace Co., Marshalltown, Ia.
- Little Burner Co., Inc., H. C., San Rafael, Calif.
- McPherson Furnace & Supply Co., Portland, Ore.
- Majestic Co., Huntington, Ind.
- Marion Furnace Co., Detroit.
- May-Flebeiger Co., Newark, O.
- Mayflower Air-Conditioners, Inc., St. Paul.
- Meyer Furnace Co., Peoria, Ill.
- Michigan Tank & Furnace Corp., Lochinvar Products Div., Detroit.
- Montag Stove & Furnace Works, Portland, Ore.
- Morrison Steel Products, Inc., Buffalo.
- Mueller Furnace Co., L. J., Milwaukee.
- National Manufacturing & Eng. Co., Detroit.
- Nelson Company, Detroit.
- Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit.
- Northwest Stove & Furnace Works, Portland, Ore.
- Nu-Way Corp., Rock Island, Ill.
- Olsen Mfg. Co., C. A., Elyria, O.
- Pacific Gas Heating Co., San Francisco.
- Parker Heating & Manufacturing Co., St. Petersburg, Fla.
- Patten Co., J. V., Sycamore, Ill.
- Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
- Perfection Stove Co., Cleveland.
- Petroleum Heat & Power Co., Stamford, Conn.
- Quaker Mfg. Co., Chicago.
- Quincy Stove Manufacturing Co., Quincy, Ill.
- Radiation Furnace Corp., Benton Harbor, Mich.
- Ray Oil Burner Co., San Francisco.
- Reif-Rexoli, Inc., Buffalo.
- Robinson Furnace Co., Chicago.
- Rosebraugh Co., W. W., Salem, Ore.
- Round Oak Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- Rybolt Heater Co., Ashland, O.
- St. Louis Furnace Manufacturing Co., St. Louis.
- Sandberg Co., H. J., Portland, Ore.
- Schwab Furnace Co., Milwaukee.
- Scott-Newcomb, Inc., St. Louis.
- Silent Sioux Oil Burner Corp., Orange City, Ia.
- Skinner Htg. & Vent. Co., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis.
- Stainless & Steel Products Co., St. Paul, Minn.
- Standard Furnace & Supply Co., Omaha, Nebr.
- Sundstrand Engineering Co., Rockford, Ill.
- Sure Comfort Furnace Co., Berwyn, Ill.
- Syncro-Flame Burner Corp., Brockton, Mass.
- Syncromatic Corporation, Milwaukee.
- Timken Silent Automatic Div., Timken-Detroit Axle Co., Detroit.
- United States Radiator Corp., Detroit.
- Viking Mfg. Corp., Dayton, O.
- Waterman-Waterbury Co., Minneapolis.
- Wayne Oil Burner Co., Fort Wayne, Ind.
- Weatherall Engineers, Inc., Providence, R. I.
- Western Blower Co., Seattle, Wash.
- Westwick & Son, Inc., John, Galena, Ill.
- Wheeling Furnace Corporation, Martins Ferry, Ohio.
- Williams Oil-O-Matic Heating Corporation, Bloomington, Ill.
- Williamson Heater Co., Cincinnati.
- Wood Industries, Inc., Gar, Detroit.
- York-Heat Div., York-Shipley, Inc., York, Pa.
- York Corp., York, Pa.

FURNACES, WARM AIR, AIR CONDITIONING, STOKER, CAST IRON

(Complete matched, stoker-furnace, fan, filter, and humidifier unit)

- Adelta Manufacturing Co., Philadelphia.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace & Foundry Co., Milan, Mich.
- American Radiator & Standard Sanitary Corp., Pittsburgh.
- Auburn Foundry, Inc., Stoker Div., Auburn, Ind.
- Bovee Furnace Works, Waterloo, Ia.
- Chandler Co., Cedar Rapids, Ia.
- Excelsior Stove & Mfg. Co., Quincy, Ill.
- Forest City Foundries Co., Cleveland, O.
- Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis.
- Grossenbacher Furnace Co., Inc., St. Louis.
- Homer Furnace & Foundry Corp., Coldwater, Mich.
- International Heater Co., Utica, N. Y.
- Keith Furnace Co., Des Moines, Ia.
- MaGiri Foundry & Furnace Works, P. H., Bloomington, Ill.
- Montag Stove & Furnace Works, Portland, Ore.

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- Mueller Furnace Co., L. J., Milwaukee.
- Schwab Furnace Co., Milwaukee.
- St. Louis Furnace Manufacturing Co., St. Louis.
- Stainless & Steel Products Co., St. Paul, Minn.
- Sioux City Foundry & Boiler Co., Sioux City, Ia.
- Williamson Heater Co., Cincinnati.
- York Corporation, York, Pa.

FURNACES, WARM AIR, AIR CONDITIONING, STOKER, STEEL

(Complete matched, stoker-furnace, fan, filter, and humidifier)

- Allis-Chalmers Mfg. Co., Milwaukee.
- American Furnace Co., St. Louis.
- American Radiator & Standard Sanitary Corp., Pittsburgh.
- Anchor Stove & Range Co., New Albany, Ind.
- Andrews Heating Co., Minneapolis.
- Arcweld Manufacturing Co., Inc., Seattle, Wash.
- Armstrong Furnace Co., Columbus, O.
- Auburn Burner Co., Auburn, Ind.
- Bard Mfg. Co., Bryan, O.
- Beck Engineering Combustion Company, St. Louis.
- Bovee Furnace Works, Waterloo, Ia.
- Campbell Heating Co., Des Moines, Ia.
- Campbell Heating Co., E. K., Kansas City, Mo.
- Chandler Co., Cedar Rapids, Ia.
- Chicago Steel Furnace Co., Chicago.
- Conco Corporation, Mendota, Ill.
- Deshler Foundry & Machine Works, Deshler, O.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Farquhar Furnace Co., Wilmington, O.
- Fitzgibbons Boiler Co., Inc., New York City.
- Forest City Foundries Co., Cleveland.
- Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis.
- Grossenbacher Furnace Co., Inc., St. Louis.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Heatlox Furnaces, Inc., Tacoma, Wash.
- Hess Warming & Ventilating Co., Chicago.
- Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.
- Iron Fireman Manufacturing Co., Cleveland.
- Jackson & Church Co., Saginaw, Mich.
- Joliet Heating Corp., Joliet, Ill.
- Keith Furnace Co., Des Moines, Ia.
- Kol-Master Corporation, Oregon, Ill.
- Koons Furnace Co., Danville, Ill.
- Lennox Furnace Co., Marshalltown, Ia.
- McPherson Furnace & Supply Co., Portland, Ore.
- Majestic Company, Huntington, Ind.
- May-Fiebeger Co., Newark, O.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- National Manufacturing & Engineering Co., Detroit.
- Nelson Company, Detroit.
- Northwest Stove & Furnace Works, Portland, Ore.
- Olsen Mfg. Co., C. A., Elyria, O.
- Parker Heating & Manufacturing Co., St. Petersburg, Fla.
- Pocahontas Fuel Co., Inc., Stoker Div., Cleveland.
- Premier Furnace Co., Dowagiac, Mich.
- Rheem Manufacturing Co., Stokermatic Div., Salt Lake City.
- Robinson Furnace Co., Chicago.
- Rosebraugh Co., W. W., Salem, Ore.
- Round Oak Co., Dowagiac, Mich.
- Rybolt Heater Co., Ashland, O.
- St. Louis Furnace Manufacturing Co., St. Louis.
- Sandberg Co., H. J., Portland, Ore.
- Schwab Furnace Co., Milwaukee.
- Stainless & Steel Products Co., St. Paul, Minn.
- Stok-A-Fire Co., Inc., University City, Mo.
- Sun-Fire Stoker Corporation, New Albany, Ind.
- Sure Comfort Furnace Co., Berwyn, Ill.
- Syncromatic Corporation, Milwaukee.
- Waterman-Waterbury Co., Minneapolis.
- Williamson Heater Co., Cincinnati.
- York Corporation, York, Pa.

FURNACES, WARM AIR, AIR CONDITIONING, UTILITY ROOM, COAL, STEEL

(Complete matched furnace with burner, fan, filter, humidifier)

- Airtemp Div., Chrysler Corp., Dayton, O.
- American Furnace Co., St. Louis.
- American Radiator & Standard Sanitary Corp., Pittsburgh.
- Armstrong Furnace Co., Columbus, O.
- Fitzgibbons Boiler Co., Inc., New York City.
- Floral City Co., Monroe, Mich.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Jackson & Church Co., Saginaw, Mich.
- Joliet Heating Corporation, Joliet, Ill.
- Kehm Corporation, Chicago.
- Lennox Furnace Co., Marshalltown, Ia.
- Parker Heating & Mfg. Co., St. Petersburg, Fla.
- Peerless Foundry Co., Inc., Indianapolis, Ind.
- Smith Heater Co., Peter, Detroit.
- Syncromatic Corporation, Milwaukee.
- Viking Manufacturing Corporation, Dayton, O.
- Williamson Heater Co., Cincinnati. (Cast Iron)

FURNACES, WARM AIR, AIR CONDITIONING, UTILITY ROOM, GAS, CAST IRON

(Complete matched furnace with burner, fan, filter, humidifier)

- Airtemp Div., Chrysler Corp., Dayton, O.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace Co., St. Louis.
- American Radiator & Standard Sanitary Corp., Pittsburgh.
- Bastian-Morley Co., Inc., LaPorte, Ind.
- Bryant Heater Co., Cleveland.
- Burke Stoker & Mfg. Co., Chicago.
- Forest City Foundries Co., Cleveland.
- General Electric Co., Air Conditioning & Commercial Refrigeration Dept., Bloomfield, N. J.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Mueller Furnace Co., L. J., Milwaukee.
- Olsen Manufacturing Co., C. A., Elyria, O.
- Richmond Radiator Co., New York City.
- Surface Combustion, Toledo.
- Viking Mfg. Corp., Dayton, O.
- York Corporation, York, Pa.

FURNACES, WARM AIR, AIR CONDITIONING, UTILITY ROOM, GAS, STEEL

(Complete matched furnace with burner, fan, filter, humidifier)

- Airtemp Div., Chrysler Corporation, Dayton, O.
- Aladdin Heating Corp., Oakland, Calif.
- Allied Heating & Air Conditioning Co., Lawndale, Calif.
- American Furnace Co., St. Louis.
- American Radiator & Standard Sanitary Corp., Pittsburgh.
- Armstrong Furnace Co., Columbus, O.
- Auburn Burner Company, Auburn, Ind.
- Bard Manufacturing Co., Bryan, O.
- Burke Stoker & Mfg. Co., Chicago.
- Coleman Lamp & Stove Co., Wichita, Kan.
- Conco Corporation, Mendota, Ill.
- Dalzen Tool & Manufacturing Co., Detroit.
- Evanoli Div., Evans Products Co., Detroit.
- Forest City Foundries Co., Cleveland.
- Fraser & Johnston Co., San Francisco.
- General Gas Light Co., Kalamazoo, Mich.
- Gibraltar Engineering Co., Los Angeles.
- Green Colonial Furnace Co., Des Moines, Ia.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Heating Equipment Co., San Francisco.
- Holly Heating & Mfg. Co., So. Pasadena, Calif.
- Huwer Heating Corp., Detroit.
- Ideal Furnace Co., Detroit.
- Jackson & Church Co., Saginaw, Mich.
- Kehm Corporation, Chicago.
- Kent & Co., Inc., J. King, St. Louis.
- Leeson Air Conditioning Corporation, Detroit.
- Lennox Furnace Co., Marshalltown, Ia.
- Majestic Co., Huntington, Ind.
- Marion Furnace Co., Detroit.
- May-Fiebeger Company, Newark, O.
- Mayflower Air Conditioners, Inc., St. Paul, Minn.
- Meyer Furnace Co., Peoria, Ill.
- Morrison Steel Products, Inc., Buffalo, N. Y.
- Mueller Furnace Co., L. J., Milwaukee.
- National Manufacturing & Eng. Co., Detroit.
- Olsen Manufacturing Co., C. A., Elyria, O.
- Palmer Manufacturing Corp., Phoenix, Ariz.
- Parker Heating & Mfg. Co., St. Petersburg, Fla.
- Patten Co., J. V., Sycamore, Ill.
- Payne Furnace & Supply Co., Beverly Hills, Calif.
- Pennsylvania Furnace & Iron Co., Warren, Pa.
- Perfection Stove Co., Cleveland.
- Resnor Manufacturing Co., Mercer, Pa.
- Round Oak Co., Dowagiac, Mich.
- Royal Air Conditioning Equip. Co., Alhambra, Calif.
- Rudy Furnace Co., Dowagiac, Mich.
- St. Louis Furnace Manufacturing Co., St. Louis.
- Viking Mfg. Corp., Dayton, O.
- Wayne Oil Burner Co., Fort Wayne, Ind.
- Wood Industries, Inc., Gar, Detroit.

FURNACES, WARM AIR, AIR CONDITIONING, UTILITY ROOM, OIL, STEEL

(Complete matched furnace with burner, fan, filter, humidifier)

- Airtemp Div., Chrysler Corporation, Dayton, O.
- American Furnace Co., St. Louis.
- American Stove Co., Lorain Div., Lorain, O.
- Anchor Post Fence Co., Heating Div., Baltimore.
- Auburn Burner Co., Auburn, Ind.
- Bard Manufacturing Co., Bryan, O.
- Cary Manufacturing Co., Waupaca, Wis.
- Coleman Lamp & Stove Co., Wichita, Kan.
- Dalzen Tool & Manufacturing Co., Detroit, Mich.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.
- Evanoli Div., Evans Products Co., Detroit.
- Gasoroll Mfg. Corp., Genoa City, Wis.
- General Electric Co., Bloomfield, N. J.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Harvey-Whipple, Inc., Springfield, Mass.
- Huwer Heating Corp., Detroit.

* Advertisement in this issue. See index to Advertisers, page 324.

- Ideal Furnace Co., Detroit.
- Interstate Metal Products Co., Inc., Chicago.
- Jackson & Church Co., Saginaw, Mich.
- Joliet Heating Corporation, Joliet, Ill.
- Kresky Mfg. Co., Petaluma, Calif.
- Kruse Company, Indianapolis.
- Lennox Furnace Co., Marshalltown, Ia.
- Little Burner Co., Inc., H. C., San Rafael, Calif.
- McPherson Furnace & Supply Co., Portland, Ore.
- Majestic Co., Huntington, Ind.
- Marion Furnace Co., Detroit.
- May-Fiebeger Co., Newark, O.
- Montag Stove & Furnace Works, Portland, Ore.
- Morrison Steel Products, Inc., Buffalo.
- Mueller Furnace Co., L. J., Milwaukee.
- National Manufacturing & Eng. Co., Detroit.
- Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit.
- Northwest Stove & Furnace Works, Portland, Ore.
- Parker Heating & Mfg. Co., St. Petersburg, Fla.
- Patten Co., J. V., Sycamore, Ill.
- Perfection Stove Co., Cleveland.
- Premier Furnace Co., Dowagiac, Mich.
- Quaker Mfg. Co., Chicago.
- Quincy Stove Manufacturing Co., Quincy, Ill.
- Round Oak Co., Dowagiac, Mich.
- Sandberg Co., H. J., Portland, Ore.
- Silent Sloux Oil Burner Corp., Orange City, Ia.
- Synchromatic Corporation, Milwaukee.
- Viking Manufacturing Corp., Dayton, O.
- Wayne Oil Burner Co., Fort Wayne, Ind.
- Weatherall Engineers, Inc., Providence, R. I.
- Wood Industries, Inc., Gar, Detroit.
- York-Heat Div., York-Shipley, Inc., York, Pa.
- York Corporation, York, Pa.

FURNACES, WARM AIR, FLOOR, GRAVITY

(For suspension beneath floor)

- Aladdin Heating Corp., Oakland, Calif.
- Allied Heating & Air Conditioning Co., Lawndale, Calif.
- American Gas Machine Company, Albert Lea, Minn. (Oil).
- American Radiator & Standard Sanitary Corp., Pittsburgh. (Gas, Oil)
- Andes Range & Furnace Corp., Geneva, N. Y.
- Armstrong Furnace Company, Columbus, Ohio. (Gas).
- Beck Engineering Combustion Company, St. Louis.
- Capps, Joseph, Inc., South Gate, Calif.
- Cole Hot Blast Manufacturing Co., Chicago. (Gas and Oil)
- Coleman Lamp & Stove Co., Wichita, Kan. (Gas, oil and butane).
- Dallman Supply Co., Sacramento, Calif.
- Day & Night Manufacturing Co., Monrovia, Calif. (Gas)
- East Anaheim Sheet Metal Works, Long Beach, Calif.
- Fraser & Johnston Co., San Francisco.
- General Wesco Stove Co., Springfield, Mo.
- Gillen Company, J. L., Dowagiac, Mich.
- Hammel Radiator Engineering Co., Los Angeles.
- Heating Equipment Co., San Francisco. (Gas)
- Holly Heating & Mfg. Co., South Pasadena, Calif. (Gas, oil, dual).
- Hotstream Heater Co., Cleveland.
- Ideal Heating Corp., Los Angeles. (Gas)
- International Sales Co., San Francisco.
- King Metal Co., Oklahoma City, Okla.
- Koons Furnace Co., Danville, Ill.
- Kresky Mfg. Co., Petaluma, Calif. (No. 3 oil).
- Little Burner Co., Inc., H. C., San Rafael, Calif. (Oil)
- Miller Floor Furnace Co., Oakland, Calif.
- Mission Water Heater Co., Los Angeles.
- Monarch Heating Co., Los Angeles.
- Moncrief Furnace & Mfg. Co., Inc., Dallas, Tex.
- Moore Corporation, Joliet, Ill.
- Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill. (Gas)
- Mueller Furnace Co., L. J., Milwaukee. (Gas)
- Norge Heating & Cond. Div., Borg-Warner Corp., Detroit. (Oil)
- O'Keefe & Merritt Co., Los Angeles.
- Pacific Gas Heating Co., San Francisco. (Gas)
- Payne Furnace & Supply Co., Beverly Hills, Calif. (Gas)
- Pennsylvania Furnace & Iron Co., Warren, Pa. (Gas)
- Pioneer Water Heater Co., Los Angeles.
- Quaker Manufacturing Co., Chicago. (Oil)
- Rock Island Stove Co., Rock Island, Ill. (Coal)
- Royal Air Conditioning Equipment Co., Alhambra, Calif. (Gas)
- Stoker-Lad Co., Tacoma, Wash.
- Surface Combustion, Toledo, O. (Gas)
- Sutphen & Co., J. W., Los Angeles.
- Tennessee Enamel Mfg. Co., Nashville, Tenn.
- U-Ni-Matic Heating Systems, Inc., Los Angeles. (Gas)
- Utility Appliance Corporation, Los Angeles. (Gas, butane).
- Ward Heater Co., Los Angeles, Calif. (Gas)
- Zink Co., John, Tulsa, Okla. (Gas).
- American Radiator & Standard Sanitary Corp., Pittsburgh
- Andes Range & Furnace Corp., Geneva, N. Y.
- Barry Furnace Co., Hamilton, O.
- Bergstrom Mfg. Corp., Neenah, Wis.
- Bovee Furnace Works, Waterloo, Ia.
- Chandler Co., Cedar Rapids, Ia.
- Columbus Heating & Ventilating Co., Columbus, O.
- Crane Company, Chicago.
- Danville Stove & Mfg. Co., Danville, Pa.
- Des Moines Stove Repair Co., Des Moines, Ia.
- Detroit-Michigan Stove Co., Detroit, Mich.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Edwards Furnace Co., Wellsboro, Pa.
- Excelsior Steel Furnace Co., Chicago.
- Excelsior Stove & Mfg. Co., Quincy, Ill.
- Farris Furnace Co., Springfield, Ill.
- Faultless Heater Corp., Cleveland.
- Favorite Stove Co., Piqua, O.
- Floyd-Wells Co., Royersford, Pa.
- Forest City Foundries Co., Cleveland.
- Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis
- Fuller-Warren Co., Milwaukee.
- Green Colonial Furnace Co., Des Moines, Ia.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Hallstead Iron Foundry, Hallstead, Pa.
- Hare Engineering Co., Detroit.
- Hart & Crouse Corporation, Utica, N. Y.
- Hart Mfg. Co., Louisville, Ky.
- Henry Furnace Co., Medina, O.
- Hess-Snyder Co., Massillon, O.
- Home Furnace Co., Holland, Mich.
- Home Stove Co., Indianapolis.
- Homer Furnace & Foundry Corp., Coldwater, Mich.
- Ideal Furnace Co., Detroit.
- Independence Stove & Furnace Co., Independence, Mo.
- International Heater Co., Utica, N. Y.
- Iowa Foundry Co., Sioux City, Ia.
- Katelman Foundry & Mfg. Co., Council Bluffs, Iowa.
- Kelth Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Syracuse, N. Y.
- Klein Stove Co., Philadelphia, Pa.
- Made-Rite Furnace Pipe & Fittings Co., Newport, Ky.
- MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
- Majestic Co., Huntington, Ind.
- Maple City Furnace Co., Monmouth, Ill.
- Marshall Furnace Co., Marshall, Mich.
- May-Fiebeger Co., Newark, O.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- Moore Corp., Joliet, Ill.
- Mount Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Oakland Foundry Co., Belleville, Ill.
- Olsen Mfg. Co., C. A., Elyria, O.
- Orbon Stove Co., Belleville, Ill.
- Pearless Foundry Co., Indianapolis, Ind.
- Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
- Pittston Stove Co., Pittston, Pa.
- Portland Stove Foundry Co., Portland, Me.
- Premier Furnace Co., Dowagiac, Mich.
- Reynolds Manufacturing Co., Springfield, Mo.
- Robinson Furnace Co., Chicago, Ill.
- Rock Island Stove Co., Rock Island, Ill.
- Rosebraugh Co., W. W., Salem, Ore.
- Round Oak Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- Rybolt Heater Co., Ashland, O.
- St. Clair Foundry Corp., Centralia, Ill.
- St. Louis Furnace Mfg. Co., St. Louis.
- Schill Mfg. Co., Crestline, O.
- Schwab Furnace Co., Milwaukee, Wis.
- Security Manufacturing Co., Kansas City, Mo.
- Sioux City Foundry and Boller Co., Sioux City, Ia.
- Spear Stove and Heater Co., James, Philadelphia.
- Stainless & Steel Products Co., St. Paul, Minn.
- Standard Furnace & Supply Co., Omaha, Nebr.
- Thatcher Furnace Co., Garwood, N. J.
- Twentieth Century Heating & Ventilating Co., Akron, O.
- Union Manufacturing Co., Inc., Boyertown, Pa.
- United States Radiator Corp., Detroit, Mich.
- Western Furnaces, Inc., Tacoma, Wash.
- Westwick & Son, Inc., John, Galena, Ill.
- Williamson Heater Co., Cincinnati.
- Wise Furnace Co., Akron, O.
- XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, GRAVITY, COAL, STEEL

- Airtemp Div., Chrysler Corporation, Dayton, O.
- American Furnace Co., St. Louis, Mo.
- American Radiator and Standard Sanitary Corp., Pittsburgh.
- Andrews Heating Co., Minneapolis.
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Armstrong Furnace Co., Columbus, O.
- Bard Manufacturing Co., Bryan, O.
- Bovee Furnace Works, Waterloo, Ia.
- Campbell Heating Co., Des Moines, Ia.
- Chandler Co., Cedar Rapids, Ia.
- Conco Corporation, Mendota, Ill.
- Daniels Mfg. Co., Inc., Sam, Hardwick, Vt.
- Deshler Foundry & Mach. Wks., Deshler, O.

* Advertisement in this issue. See Index to Advertisers, page 324.

FURNACES, WARM AIR, GRAVITY, COAL, CAST IRON

- Adelta Manufacturing Co., Philadelphia.
- Agricola Furnace Co., Inc., Gadsden, Ala.
- Airtemp Div., Chrysler Corporation, Dayton, O.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace Co., St. Louis.
- American Furnace & Foundry Co., Milan, Mich.

- Des Moines Stove Repair Co., Des Moines, Ia.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Excelsior Steel Furnace Co., Chicago, Ill.
- Farquhar Furnace Co., Wilmington, O.
- Faultless Heater Corp., Cleveland, O.
- Floral City Co., Monroe, Mich.
- Forest City Foundries Co., Cleveland, O.
- Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis.
- Gascol Furnace Co., Pittsburgh (Combination Coal and Gas)
- Gehrl Co., Tacoma, Wash.
- Green Colonial Furnace Co., Des Moines, Ia.
- Grossenbacher Furnace Co., St. Louis, Mo.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Hart Mfg. Co., Louisville, Ky.
- Henry Furnace Company, Medina, O.
- Hess-Snyder Co., Massillon, O.
- Hess Warming & Ventilating Co., Chicago, Ill.
- Home Stove Co., Indianapolis, Ind.
- Homer Furnace & Foundry Corp., Coldwater, Mich.
- Ideal Furnace Co., Detroit, Mich.
- Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.
- International Heater Co., Utica, N. Y.
- Jackson & Church Co., Saginaw, Mich.
- Joliet Heating Corp., Joliet, Ill.
- Keith Furnace Co., Des Moines, Ia.
- Koons Furnace Co., Danville, Ill.
- Leader Iron Works, Inc., Decatur, Ill.
- Lennox Furnace Co., Marshalltown, Ia.
- Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
- Made-Rite Furnace Pipe & Fittings Co., Newport, Ky.
- McPherson Furnace & Supply Co., Portland, Ore.
- Majestic Co., Huntington, Ind.
- Majestic Furnace Co., Seattle, Wash.
- Marshall Furnace Co., Marshall, Mich.
- May-Flebeiger Co., Newark, O.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- National Mfg. & Engineering Co., Detroit.
- Northwest Stove & Furnace Works, Portland, Ore.
- Nugent Furnaces, Thos., New York City.
- Olsen Mfg. Co., C. A., Elyria, O.
- Parker Heating & Mfg. Co., St. Petersburg, Fla.
- Peerless Foundry Co., Indianapolis, Ind.
- Pennsylvania Engineering Works, New Castle, Pa.
- Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
- Portland Stove Foundry Co., Portland, Me.
- Premier Furnace Co., Dowagiac, Mich.
- Ramey Mfg. Co., Columbus, O.
- Ribside Furnace Co., Wausau, Wis.
- Robinson Furnace Co., Chicago.
- Round Oak Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- Rybolt Heater Co., Ashland, O.
- St. Louis Furnace Mfg. Co., St. Louis.
- Sandberg Co., H. J., Portland, Ore.
- Schill Mfg. Co., Crestline, O.
- Schwab Furnace Co., Milwaukee, Wis.
- Sioux City Foundry and Boiler Co., Sioux City, Ia.
- Spencer Heater Div., Aviation Corp., Williamsport, Pa.
- Stainless & Steel Products Co., St. Paul, Minn.
- Standard Furnace & Supply Co., Omaha, Nebr.
- Stanton Heater Co., Martins Ferry, O.
- Sure Comfort Furnace Co., Berwyn, Ill.
- Syncromatic Corporation, Milwaukee.
- Thatcher Furnace Company, Garwood, N. J.
- Tri-State Heating Supply Co., Fort Wayne, Ind.
- Twentieth Century Heating & Ventilating Co., Akron, O.
- United States Radiator Corp., Detroit.
- Viking Mfg. Co., Dayton, O.
- Waterman-Waterbury Co., Minneapolis, Minn.
- Wayne Oil Burner Co., Fort Wayne, Ind.
- Wheeling Furnace Corporation, Martins Ferry, O.
- Williamson Heater Co., Cincinnati.
- XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, GRAVITY, GAS, CAST IRON

- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace Co., St. Louis, Mo.
- Bryant Heater Co., Cleveland.
- Burke Stoker & Mfg. Co., Chicago.
- Chandler Co., Cedar Rapids, Ia.
- Favorite Stove Co., Piqua, O.
- Forest City Foundries Co., Cleveland, O.
- Hart Mfg. Co., Louisville, Ky.
- Henry Furnace Company, Medina, O.
- Hess-Snyder Co., Massillon, O.
- Ideal Furnace Co., Detroit.
- Jackson Sheet Metal Works, Ogden, Utah. (Combination Iron and Steel)
- Johnson Gas Furnace Corp., North Hollywood, Calif.
- Kelsey Heating Co., Syracuse, N. Y.
- Marshall Furnace Co., Marshall, Mich.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Olsen Manufacturing Co., C. A., Elyria, O.
- Richmond Radiator Co., New York City.
- Rudy Furnace Co., Dowagiac, Mich.
- Rybolt Heater Company, Ashland, O.
- Sioux City Foundry & Boiler Co., Sioux City, Ia.
- Surface Combustion, Toledo, O.

- Twentieth Century Heating & Ventilating Co., Akron, O.
- Wise Furnace Co., Akron, O.
- XXth Century Heating & Ventilating Co., Akron, O.
- York Corporation, York, Pa.

FURNACES, WARM AIR, GRAVITY, GAS, STEEL

- Airtemp Div., Chrysler Corporation, Dayton, O.
- Aladdin Heating Corp., Oakland, Calif.
- Allied Heating & Air Conditioning Co., Lawndale, Calif.
- American Furnace Co., St. Louis, Mo.
- American Radiator and Standard Sanitary Corp., Pittsburgh.
- Andrews Heating Co., Minneapolis.
- Armstrong Furnace Co., Columbus, O.
- Bard Manufacturing Company, Bryan, Ohio.
- Beck Engineering Combustion Company, St. Louis.
- Brown Steel Tank Co., Minneapolis.
- Bryant Corp., C. L., Cleveland, O.
- Burke Stoker & Mfg. Co., Chicago.
- Calkins & Pearce, Columbus, O.
- Campbell Heating Co., Des Moines, Ia.
- Cocking, Geo. J., Santa Ana, Calif.
- Coleman Lamp & Stove Company, Wichita, Kansas.
- Conco Corporation, Mendota, Ill.
- Dallman Supply Co., Sacramento, Calif.
- Dornback Furnace & Foundry Co., Cleveland.
- Forest City Foundries Co., Cleveland, O.
- Fraser and Johnston Co., San Francisco.
- Gascol Furnace Co., Pittsburgh. (Comb. Coal and Gas)
- Green Colonial Furnace Co., Des Moines, Ia.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Hammel Radiator Engineering Co., Los Angeles.
- Heating Equipment Co., San Francisco.
- Henry Furnace Company, Medina, O.
- Hotentot Company, Inc., Omaha, Nebr.
- Ideal Furnace Co., Detroit.
- Independence Stove & Furnace Co., Independence, Mo.
- International Sales Co., San Francisco.
- Johnston Gas Furnace Corp., North Hollywood, Calif.
- Lennox Furnace Co., Marshalltown, Ia.
- Made-Rite Furnace Pipe & Fittings Co., Newport, Ky.
- Marion Furnace Co., Detroit.
- May-Flebeiger Co., Newark, O.
- Meyer Furnace Co., Peoria, Ill.
- Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- National Mfg. & Engineering Co., Detroit.
- New Mission Heating & Ventilating Co., San Francisco.
- Northern Furnace & Supply Co., Billings, Mont.
- Nugent Furnaces, Thomas, New York City.
- Olsen Mfg. Co., C. A., Elyria, O.
- Pacific Gas Heating Company, San Francisco.
- Parker Heating & Manufacturing Co., St. Petersburg, Fla.
- Payne Furnace & Supply Co., Beverly Hills, Calif.
- Perfection Stove Co., Cleveland.
- Royal Air Conditioning Equipment Co., Alhambra, Calif.
- Rudy Furnace Co., Dowagiac, Mich.
- Rybolt Heater Co., Ashland, O.
- Ryniker Steel Products Company, Billings, Mont.
- St. Louis Furnace Mfg. Co., St. Louis.
- Schill Mfg. Co., Crestline, Ohio.
- Scott-Newcomb, Inc., St. Louis, Mo.
- Security Manufacturing Co., Kansas City, Mo.
- Sonner Burner Co., Winfield, Kansas.
- Standard Furnace & Supply Company, Omaha, Nebr.
- United States Radiator Corp., Detroit.
- Waterman-Waterbury Co., Minneapolis, Minn.
- Williamson Heater Co., Cincinnati.

FURNACES, WARM AIR, GRAVITY, OIL, CAST IRON

- Adelta Manufacturing Co., Philadelphia.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace & Foundry Co., Milan, Mich.
- American Radiator & Standard Sanitary Corp., Pittsburgh.
- Chandler Co., Cedar Rapids, Ia.
- Edwards Furnace Co., Wellsboro, Pa.
- Hart & Crouse Corporation, Utica, N. Y.
- Ideal Furnace Co., Detroit.
- International Heater Co., Utica, N. Y.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Syracuse, N. Y.
- Marshall Furnace Co., Marshall, Mich.
- Montag Stove & Furnace Works, Portland, Ore.
- Mount Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
- Mueller Furnace Co., L. J., Milwaukee.
- St. Louis Furnace Mfg. Co., St. Louis.
- Sioux City Foundry & Boiler Co., Sioux City, Ia.
- Stainless & Steel Products Co., St. Paul, Minn.
- Thatcher Furnace Co., Garwood, N. J.
- Wise Furnace Company, Akron, O.

FURNACES, WARM AIR, GRAVITY, OIL, STEEL

- Airtemp Division, Chrysler Corp., Dayton, O.
- American Air Conditioning Corp., Sebastopol, Calif.
- American Furnace Co., St. Louis.
- American Radiator & Standard Sanitary Corp., Pittsburgh.
- Andrews Heating Co., Minneapolis.
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Armstrong Furnace Co., Columbus, O.
- Bard Manufacturing Co., Bryan, O.
- Beck Engineering Combustion Company, St. Louis.

• Advertisement in this issue. See Index to Advertisers, page 324.

- Bovee Furnace Works, Waterloo, Ia.
- Brown Steel Tank Co., Minneapolis.
- Campbell Heating Co., Des Moines, Ia.
- Cary Mfg. Co., Waupaca, Wis.
- Chandler Co., Cedar Rapids, Ia.
- Conco Corp., H. D. Conkey & Co., Mendota, Ill.
- Duo-Therm Div., Motor Wheel Corporation, Lansing, Mich.
- Evanoli Heater Div., Evans Products Co., Detroit.
- Farquhar Furnace Co., Wilmington, O.
- Forest City Foundries Co., Cleveland.
- Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis.
- Gasoroli Mfg. Corp., Genoa City, Wis.
- Gehrl Co., Tacoma, Wash.
- Gilbert & Barker Mfg. Co., West Springfield, Mass.
- Gillen Co., J. L., Dowagiac, Mich.
- Green Colonial Furnace Co., Des Moines, Ia.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Henry Furnace Co., Medina, O.
- Hess Warming & Ventilating Co., Chicago.
- Hotentot Co., Inc., Omaha, Nebr.
- Ideal Furnace Co., Detroit.
- International Sales Co., San Francisco.
- Johnston Gas Furnace Corp., North Hollywood, Calif.
- Joliet Heating Corp., Joliet, Ill.
- Keith Furnace Co., Des Moines, Ia.
- Koons Furnace Co., Danville, Ill.
- Kruse Co., Indianapolis.
- Lennox Furnace Co., Marshalltown, Ia.
- Little Burner Co., Inc., H. C., San Rafael, Calif.
- May-Fiebeger Co., Newark, O.
- Meyer Furnace Co., Peoria, Ill.
- Michigan Tank & Furnace Corp., Lochinvar Products Div., Detroit.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee.
- Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit.
- Northwest Stove & Furnace Works, Portland, Ore.
- Nugent Furnaces, Thomas, New York City.
- Olsen Mfg. Co., C. A., Elyria, O.
- Parker Heating & Manufacturing Co., St. Petersburg, Fla.
- Peerless Foundry Co., Indianapolis.
- Perfection Stove Co., Cleveland.
- Portland Stove Foundry Co., Portland, Me.
- Premier Furnace Co., Dowagiac, Mich.
- Quaker Manufacturing Co., Chicago.
- Quincy Stove Manufacturing Co., Quincy, Ill.
- Robk Island Stove Co., Rock Island, Ill.
- Rosebraugh Co., W. W., Salem, Ore.
- Round Oak Co., Dowagiac, Mich.
- Rybolt Heater Co., Ashland, O.
- St. Louis Furnace Mfg. Co., St. Louis.
- Sandberg Co., H. J., Portland, Ore.
- Scott-Newcomb, Inc., St. Louis.
- Stainless & Steel Products Co., St. Paul, Minn.
- Standard Furnace & Supply Co., Omaha, Nebr.
- Sure Comfort Furnace Co., Berwyn, Ill.
- Syncromatic Corporation, Milwaukee.
- Thatcher Furnace Co., Garwood, N. J.
- United States Radiator Corp., Detroit.
- Viking Mfg. Corp., Dayton, O.
- Waterman-Waterbury Co., Minneapolis.
- Wayne Oil Burner Co., Fort Wayne, Ind.
- Western Blower Co., Seattle, Wash.
- Williamson Heater Co., Cincinnati.

FURNACES, WARM AIR, GRAVITY, STOKER, CAST IRON

- Adelta Manufacturing Co., Philadelphia.
- American Furnace & Foundry Co., Milan, Mich.
- American Radiator & Standard Sanitary Corp., Pittsburgh.
- Anchor Stove & Range Co., New Albany, Ind.
- Bovee Furnace Works, Waterloo, Ia.
- Chandler Co., Cedar Rapids, Ia.
- Excelsior Stove & Mfg. Co., Quincy, Ill.
- Forest City Foundries Co., Cleveland.
- Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis.
- Grossenbacher Furnace Co., Inc., St. Louis.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Ideal Furnace Co., Detroit.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Inc., Syracuse, N. Y.
- Majestic Co., Huntington, Ind.
- Marshall Furnace Co., Marshall, Mich.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
- Mueller Furnace Co., L. J., Milwaukee. (Double Radiator)
- Premier Furnace Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- Schwab Furnace Co., Milwaukee, Wis.
- Sioux City Fdy. & Boiler Co., Sioux City, Ia.
- Stainless & Steel Products Co., St. Paul, Minn.

FURNACES, WARM AIR, GRAVITY, STOKER, STEEL

- American Furnace Co., St. Louis.
- American Radiator & Standard Sanitary Corp., Pittsburgh.
- Andrews Heating Co., Minneapolis.
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Armstrong Furnace Co., Columbus, O.

- Beck Engineering Combustion Company, St. Louis.
- Campbell Heating Co., Des Moines, Ia.
- Floral City Co., Monroe, Mich.
- Forest City Foundries Co., Niagara Furnace Div., Cleveland.
- Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis.
- Grossenbacher Furnace Co., St. Louis.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Henry Furnace Co., Medina, O.
- Hess Warming & Ventilating Co., Chicago.
- Ideal Furnace Co., Detroit.
- Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.
- Keith Furnace Co., Des Moines, Ia.
- Lennox Furnace Co., Marshalltown, Ia.
- Majestic Co., Huntington, Ind.
- May-Fiebeger Co., Newark, O.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Northwest Stove & Furnace Works, Portland, Ore.
- Olsen Mfg. Co., C. A., Elyria, O.
- Parker Heating & Manufacturing Co., St. Petersburg, Fla.
- Premier Furnace Co., Dowagiac, Mich.
- Rheem Manufacturing Co., Stokermatic Div., Salt Lake City.
- Round Oak Co., Dowagiac, Mich.
- Rybolt Heater Co., Ashland, O.
- St. Louis Furnace Mfg. Co., St. Louis.
- Schwab Furnace Co., Milwaukee.
- Spencer Heater Div., Aviation Corp., Williamsport, Pa.
- Stainless & Steel Products Co., St. Paul, Minn.
- Stok-A-Fire Co., Inc., University City, Mo.
- Sure Comfort Furnace Co., Berwyn, Ill.
- Syncromatic Corporation, Milwaukee.
- Waterman-Waterbury Co., Minneapolis.
- Williamson Heater Co., Cincinnati.

FURNACES, WARM AIR, HORIZONTAL

- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace Co., St. Louis.
- Andrews Heating Co., Minneapolis.
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Campbell Heating Co., E. K., Kansas City, Mo.
- Columbus Heating & Ventilating Co., Columbus, O.
- Dravo Corporation, Pittsburgh.
- Floral City Co., Monroe, Mich.
- International Sales Co., San Francisco.
- MaGiri Foundry & Furnace Works, P. H., Bloomington, Ill.
- Majestic Co., Huntington, Ind.
- McPherson Furnace & Supply Co., Portland, Ore.
- Monerief Furnace Co., Atlanta, Ga.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee.
- National Heater Company, Minneapolis.
- National Manufacturing & Engineering Co., Detroit.
- Northwest Stove & Furnace Works, Portland, Ore.
- Parker Heating & Manufacturing Co., St. Petersburg, Fla.
- Ramey Mfg. Co., Columbus, O.
- Rosebraugh Co., W. W., Salem, Ore.
- Sandberg Co., H. J., Portland, Ore.
- Stainless & Steel Products Co., St. Paul, Minn.
- Twentieth Century Heating & Ventilating Co., Akron, O.
- Western Blower Co., Seattle, Wash.
- Western Furnaces, Inc., Tacoma, Wash.
- XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, PIPELESS, CAST IRON

- Agricola Furnace Co., Inc., Gadsden, Ala.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace Co., St. Louis.
- American Furnace & Foundry Co., Milan, Mich.
- American Radiator & Standard Sanitary Corp., Pittsburgh.
- Andes Range & Furnace Corp., Geneva, N. Y.
- Barry Furnace Co., Hamilton, O.
- Chandler Co., Cedar Rapids, Ia.
- Danville Stove & Mfg. Co., Danville, Pa.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Edwards Furnace Co., Wellsboro, Pa.
- Excelsior Steel Furnace Co., Chicago.
- Excelsior Stove & Mfg. Co., Quincy, Ill.
- Favorite Stove Co., Piqua, O.
- Floyd-Wells Co., Royersford, Pa.
- Forest City Foundries Co., Cleveland.
- Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis.
- Grossenbacher Furnace Co., Inc., St. Louis.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Hart & Crouse Corporation, Utica, N. Y.
- Hart Mfg. Co., Louisville, Ky.
- Henry Furnace Co., Medina, O.
- Home Furnace Co., Holland, Mich.
- Home Stove Co., Indianapolis.
- Homer Furnace & Foundry Corp., Coldwater, Mich.
- Ideal Furnace Co., Detroit.
- Independence Stove & Furnace Co., Independence, Mo.
- International Heater Co., Utica, N. Y.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Syracuse, N. Y.
- MaGiri Foundry & Furnace Works, P. H., Bloomington, Ill.
- Marshall Furnace Co., Marshall, Mich.
- May-Fiebeger Co., Newark, O.
- Meyer Furnace Co., Peoria, Ill.

• Advertisement in this issue. See Index to Advertisers, page 824.

- Montag Stove & Furnace Works, Portland, Ore.
- Moore Corp., Joliet, Ill.
- Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
- Mueller Furnace Co., L. J., Milwaukee.
- Olsen Mfg. Co., C. A., Elyria, O.
- Orbon Stove Co., Belleville, Ill.
- Pittsburgh Furnace Parts Co., Pittsburgh.
- Portland Stove Foundry Co., Portland, Me.
- Premier Furnace Co., Dowagiac, Mich.
- Ravenna Furnace & Heating Co., Ravenna, O.
- Rudy Furnace Co., Dowagiac, Mich.
- Rybolt Heater Co., Ashland, O.
- St. Clair Foundry Corp., Centralia, Ill.
- St. Louis Furnace Mfg. Co., St. Louis.
- Schill Mfg. Co., Crestline, O.
- Schwab Furnace Co., Milwaukee.
- Sioux City Foundry & Boiler Co., Sioux City, Ia.
- Spear Stove & Heater Co., James, Philadelphia.
- Stiglitz Furnace & Foundry Co., Louisville, Ky.
- Thatcher Furnace Co., Garwood, N. J.
- Twentieth Century Heating & Ventilating Co., Akron, O.
- United States Radiator Corp., Detroit.
- Western Furnaces, Inc., Tacoma, Wash.
- Westwick & Son, Inc., John, Galena, Ill.
- Williamson Heater Co., Cincinnati.
- Wise Furnace Co., Akron, O.
- XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, PIPELESS, STEEL

- Airtherm Manufacturing Co., St. Louis.
- Aladdin Heating Corp., Oakland, Calif.
- Andrews Heating Co., Minneapolis.
- Arcweld Manufacturing Co., Inc., Seattle, Wash.
- Armstrong Furnace Co., Columbus, O.
- Campbell Heating Co., Des Moines, Ia.
- Daniels Mfg. Co., Inc., Sam, Hardwick, Vt.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Grossenbacher Furnace Co., St. Louis.
- Hart Mfg. Co., Louisville, Ky.
- Hess Warming & Ventilating Co., Chicago.
- Home Stove Co., Indianapolis.
- Ideal Furnace Co., Detroit.
- International Heater Co., Utica, N. Y.
- Jackson & Church Co., Saginaw, Mich.
- Kehm Corporation, Chicago, Ill.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Syracuse, N. Y.
- Koons Furnace Co., Danville, Ill.
- Lennox Furnace Co., Marshalltown, Ia.
- Majestic Furnace Co., Seattle, Wash.
- May-Fiebeger Co., Newark, O.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- Northwest Stove & Furnace Works, Portland, Ore.
- Nugent Furnaces, Thom., New York City.
- Orbon Stove Co., Belleville, Ill.
- Pennsylvania Furnace & Iron Co., Warren, Pa.
- Pittsburgh Furnace Parts Co., Pittsburgh.
- Ramey Mfg. Co., Columbus, O.
- Rosebraugh Co., W. W., Salem, Ore.
- St. Louis Furnace Mfg. Co., St. Louis.
- Schwab Furnace Co., Milwaukee.
- Stanton Heater Co., Martins Ferry, O.
- Stiglitz Furnace & Foundry Co., Louisville, Ky.
- Syncromatic Corporation, Milwaukee, Wis.
- Waterman-Waterbury Co., Minneapolis, Minn.

FURNACES, WARM AIR, WOOD BURNING, CAST IRON

- Hart & Crouse Corporation, Utica, N. Y.
- Homer Furnace & Foundry Corp., Coldwater, Mich.
- International Heater Co., Utica, N. Y.
- Keith Furnace Co., Des Moines, Ia.
- MaGill Foundry & Furnace Works, P. H., Bloomington, Ill.
- Majestic Co., Huntington, Ind.
- Moncreif Furnace & Mfg. Co., Dallas, Tex.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee.
- Oakland Foundry Co., Belleville, Ill.
- Portland Stove Foundry Co., Portland, Me.
- Schwab Furnace Co., Milwaukee.
- Stainless & Steel Products Co., St. Paul, Minn.
- Western Furnaces, Inc., Tacoma, Wash.

FURNACES, WARM AIR, WOOD BURNING, STEEL

- American Furnace Co., St. Louis.
- Andrews Heating Co., Minneapolis.
- Arcweld Manufacturing Co., Inc., Seattle, Wash.
- Bovee Furnace Works, Waterloo, Ia.
- Campbell Heating Co., Des Moines, Ia.
- Campbell Heating Co., E. K., Kansas City, Mo.
- Daniels Mfg. Co., Inc., Sam, Hardwick, Vt.
- Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis.
- Grossenbacher Furnace Co., St. Louis.
- Hess Warming & Ventilating Co., Chicago.
- McPherson Furnace & Supply Co., Portland, Ore. (Also Saw-dust)

- Meyer Furnace Co., Peoria, Ill.
- Moncreif Furnace & Mfg. Co., Dallas, Tex.
- Montag Stove & Furnace Works, Portland, Ore.
- Northwest Stove & Furnace Works, Portland, Ore.
- Nugent Furnaces, Thomas, New York City.
- Parker Heating & Mfg. Co., St. Petersburg, Fla.
- Rosebraugh Co., W. W., Salem, Ore.
- Sandberg Co., H. J., Portland, Ore.
- Schwab Furnace Co., Milwaukee.
- Stainless & Steel Products Co., St. Paul, Minn.
- Syncromatic Corporation, Milwaukee.

GAGES, AIR FILTER

- Air Filter Engineering Co., Chicago.
- Defender Instrument and Regulator Co., St. Louis.
- Dwyer Mfg. Co., F. W., Chicago.
- Ellison Draft Gage Co., Chicago.
- Hays Corporation, Michigan City, Ind.
- Herbusch Corporation, Simplex Control Div., St. Louis.
- Hill, E. Vernon, Chicago.
- Hotstream Heater Co., Cleveland.
- Huyette Co., Inc., Paul B., Philadelphia.
- Meriam Co., Cleveland.
- Uehling Instrument Co., Paterson, N. J.

GAS BURNERS

See Burners, Gas

GAGES, INDICATING, DRAFT, PORTABLE

- Bacharach Industrial Instrument Co., Pittsburgh.
- Bristol Company, Waterbury, Conn.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Defender Instrument and Regulator Co., St. Louis.
- Detroit Air Conditioning Service Co., Inc., Detroit.
- Dwyer Mfg. Co., F. W., Chicago.
- Ellison Draft Gage Co., Chicago.
- Foxboro Co., Foxboro, Mass.
- Hays Corp., Michigan City, Ind.
- Hill, E. Vernon, Chicago.
- Hotstream Heater Co., The, Cleveland.
- Marsh Corporation, Jas. P., Chicago.
- Meriam Co., Cleveland.
- Moeller Instrument Co., Richmond Hill, N. Y.
- Precision Thermometer & Instrument Co., Philadelphia.
- Preferred Utilities Mfg. Corp., New York City.
- Scientific Instrument Co., Detroit.
- Uehling Instrument Co., Paterson, N. J.
- Weaver Mfg. Co., Springfield, Ill.

GATES, BLAST

See Blast Gates

GLASS, SAFETY

- Libbey-Owens-Ford Glass Co., Toledo, O.
- Mississippi Glass Company, New York City.
- Pittsburgh Plate Glass Co., Pittsburgh.
- Saftee Glass Co., Philadelphia.

GLASS, WIRE, FOR SKYLIGHTS

- Atcheson Glass Co., T. J., Buffalo.
- Bache & Co., Semon, New York City.
- Libbey, Owens, Ford Glass Co., Toledo, O.
- Mississippi Glass Co., New York City.
- Pennsylvania Wire Glass Co., Philadelphia.
- Pittsburgh Plate Glass Co., Pittsburgh.

GLAZING COMPOUNDS

See Compounds, Glazing

GRILLES, HEATING AND VENTILATING

See Faces and Registers

GRILLES, VENTILATING SYSTEM (METAL)

- Air Control Products, Inc., Coopersville, Mich.
- Auer Register Co., Cleveland.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Warming & Ventilating Co., Toledo, O.
- Beckley Perforating Co., Garwood, N. J.
- Best Register Co., Milwaukee, Wis.
- Erdle Perforating Company, Rochester, N. Y.
- Hart & Cooley Mfg. Co., Holland, Mich.
- Hendrick Manufacturing Co., Carbondale, Pa.
- Independent Register Co., Cleveland, O.
- Mundt & Sons, Charles, Jersey City, N. J.
- Rock Island Register Co., Rock Island, Ill.
- Stewart Manufacturing Co., Bloomfield, N. J.
- Tuttle & Bailey, Inc., New Britain, Conn.
- United States Air Conditioning Corp., Minneapolis.
- Waterloo Register Co., Waterloo, Ia.
- Western Wire & Iron Works, Inc., Chicago.

GRINDERS, BUFFERS, POLISHERS AND SANDERS

See Buffers, Grinders, Polishers and Sanders

GROOVING MACHINES

See Machines, Grooving

GUARDS, MACHINERY

- Biersach & Niedermeyer Co., Milwaukee.
- California Wire Cloth Corporation, Oakland, Calif.

• Advertisement in this issue. See Index to Advertisers, page 324.

- Chicago Metal Mfg. Co., Chicago.
- Harrington & King Perforating Co., Chicago.
- Littleford Bros., Inc., Cincinnati.
- Rlester & Thesmacher Co., Cleveland.
- Southbridge Roofing Co., Inc., Southbridge, Mass.
- Wickwire Spencer Steel Co., New York City.

GUARDS, SNOW

- Berger Brothers Co., Philadelphia.
- Boyd & Co., Inc., Chas. P., Philadelphia.
- Cartier & Sons Co., M. N., Providence, R. I.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Danzer Metal Works Co., Hagerstown, Md. (All types).
- Downs-Smith Brass & Copper Co., New York City.
- Folsom Snow Guard Co., Millis, Mass.
- Hussey & Co., C. G., Pittsburgh. (Copper)
- Levow, David, New York City.
- Maysteel Products, Inc., Mayaville, Wis.
- Royal-Apex Mfg. Corp., Brooklyn. (Cast Iron)

GUNS, SPRAY, METALS

Turner Brass Works, Sycamore, Ill.

GUNS, SPRAY, PAINT

- Binks Mfg. Co., Chicago.
- De Vilbiss Co., Toledo, O.
- Eclipse Air Brush Company, Inc., Newark, N. J.
- Electric Sprayt Co., Sheboygan, Wis.
- Milburn Co., Alexander, Baltimore.
- Norris Airless Painting Machinery Corp., Greenwich, Conn.
- Spray Engineering Co., Somerville, Mass.

GUTTER FORMERS

See *Machines, Gutter Forming*

GUTTERS

See *Eaves Trough and Gutters*

HAMMERS, ELECTRIC OR PNEUMATIC

- Brown-Appton Co., New York City. (Pneumatic).
- Chicago Pneumatic Tool Co., New York City. (Pneumatic).
- Coast Pneumatic Tool Co., Los Angeles. (Pneumatic).
- Keller Tool Company, Grand Haven, Mich. (Pneumatic).
- Stanley Tools, New Britain, Conn. (Electric).
- Superior Flux Co., Cleveland. (Pneumatic).
- Whiting Corporation, Harvey, Ill.
- Wodack Electric Tool Corp., Chicago. (Electric).
- Yoder Co., Cleveland.

HANGERS

See *Fittings and Accessories, Eaves Trough and Gutter*

HANGERS AND SUPPORTS, PIPE

- Packless Metal Products Corp., New Rochelle, N. Y. (Flexible Fasteners for Metal Hose and Tubing)

HARDWARE, FOR CABINETS AND CASINGS

(Handles, name plates, etc.)

- American Cabinet Hardware Corp., Rockford, Ill. (Pulls, Knobs, Hinges, Catches, etc.)
- American Emblem Co., Utica, N. Y. (Name Plates)
- American Insulator Corp., New Freedom, Pa.
- Anti-Corrosive Metal Products Co., Inc., Albany, N. Y. (Stainless).
- Brasco Manufacturing Co., Harvey, Ill.
- Crowe Name Plate & Mfg. Co., Chicago.
- Dickey-Grabler Co., Cleveland. (Name Plate)
- Etched Products Co., Long Island City, N. Y. (Name Plates)
- General Etching & Mfg. Co., Chicago. (Name Plates)
- Grammes, L. F. & Sons, Inc., Allentown, Pa.
- Imperial Molded Products Corp., Chicago. (Plastic Handles, Pulls and Knobs)
- Mason & Sons, F. E., Batavia, N. Y. (Name Plates)
- Metal Marker Co., Cleveland. (Name Plates)
- National Brass Co., Grand Rapids, Mich.
- National Lock Co., Rockford, Ill.
- Premier Metal Etching Co., Long Island City. (Name Plates)
- Sosa Manufacturing Co., Detroit. (Invisible Hinges)
- Stafford Co., N., Brooklyn, N. Y. (Name Plates)
- Stanley Mfg. Co., Dayton, O. (Name Plates)

HEADS

See *Fittings and Accessories, Conductor*

HEAT TRANSFER SURFACE

See *Coils, Cooling, Direct Expansion; Coils, Heating; Coils, Cooling Water*

HEATERS, CIRCULATING, CABINET TYPE

- Acme Tin Plate & Roofing Supply Co., Philadelphia. (Electric)
- American Gas Machine Company, Albert Lea, Minn. (Oil).
- American Stove Co., Lorain Div., Lorain, O. (Oil)
- Andrews Heating Co., Minneapolis. (Coal and Oil)
- Auburn Burner Co., Auburn, Ind. (Oil)
- Bern's Specialty Mfg. Co., Chicago. (Steam)
- Cole Hot Blast Mfg. Co., Chicago. (Coal, Oil, Gas, Wood)
- Coleman Lamp & Stove Co., Wichita, Kan. (Oil).

- Coroaire Heater Corporation, Cleveland. (Gas, Oil).
- Dallman Supply Co., Sacramento, Calif. (Gas)
- Day & Night Manufacturing Co., Monrovia, Calif. (Gas)
- Duo-Therm Div., Motor Wheel Corp., Lansing, Mich. (Oil)
- Edwards Mfg. Co., Inc., Cincinnati. (Coal, Coke, Wood)
- Enterprise Foundry Co., Belleville, Ill. (Coal and Wood)
- Estate Stove Co., Hamilton, O. (Coal, Oil, Gas)
- Evanoli Heater Div., Evans Products Co., Detroit. (Oil & Gas)
- Excelsior Stove & Mfg. Co., Quincy, Ill.
- Florence Stove Co., Garner, Mass. (Oil)
- General Gas Light Co., Kalamazoo, Mich.
- Hammel Radiator Engineering Co., Los Angeles. (Gas).
- Heating Equipment Co., San Francisco. (Gas)
- Independence Stove & Furnace Co., Independence, Mo. (Gas or Coal)

- Kehm Corporation, Chicago. (Gas and Coal)
- Kresky Mfg. Co., Petaluma, Calif. (Oil)
- Laco Oil Burner Co., Griswold, Ia. (Oil)
- Little Burner Co., Inc., H. C., San Rafael, Calif. (Oil)
- Loneragan Manufacturing Co., Albion, Mich. (Oil)
- Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill. (Coal, Gas, Oil and Wood)
- Moore Corporation, Joliet, Ill. (Coal, Gas, Oil)
- Ohio Foundry & Mfg. Co., Steubenville, O. (Gas)
- Patten Co., J. V., Sycamore, Ill. (Coal, Oil and Gas)
- Payne Furnace & Supply Co., Beverly Hills, Calif.
- Perfection Stove Co., Cleveland. (Oil)
- Pernot & Rich, Inc., Los Angeles. (Gas)
- Pittston Stove Co., Pittston, Pa. (Coal or Wood)
- Quaker Mfg. Co., Chicago. (Oil)
- Quincy Stove Mfg. Co., Quincy, Ill. (Oil and Coal)
- Reznor Mfg. Co., Mercer, Pa. (Gas)
- Royal Air Conditioning Equip. Co., Alhambra, Calif. (Gas)
- Schoedinger, F. O., Columbus, O.
- Silent Sioux Oil Burner Corp., Orange City, Ia. (Oil)
- Surface Combustion, Toledo, O. (Gas)
- Tennessee Enamel Mfg. Co., Nashville, Tenn. (Gas)
- Utility Appliance Corporation, Los Angeles. (Gas, Butane).
- Victor Oil Burner Mfg. Co., Hartford, Conn.
- Viking Mfg. Corp., Dayton, O. (Oil)
- Washington Stove Works, Everett, Wash. (Wood).

HEATERS, DIRECT FIRED

See *Furnaces*

HEATERS, RADIANT, GAS-FIRED

- Day & Night Manufacturing Co., Monrovia, Calif.
- General Gas Light Co., Kalamazoo, Mich.
- Hotstream Heater Co., Cleveland. (Wall type).
- Reznor Manufacturing Co., Mercer, Pa.
- Schoedinger, F. O., Columbus, O.
- Tennessee Enamel Mfg. Co., Nashville, Tenn.

HEATERS, SCHOOL ROOM

- Agricola Furnace Co., Inc., Gadsden, Ala.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace & Foundry Co., Milan, Mich.
- American Radiator and Standard Sanitary Corp., Pittsburgh.
- Andrews Heating Co., Minneapolis.
- Barry Furnace Co., Hamilton, O.
- Campbell Heating Co., Des Moines, Ia.
- Chandler Co., Cedar Rapids, Ia.
- Chicago Steel Furnace Co., Chicago (Gas or Oil)
- Daniels Mfg. Co., Inc., Sam, Hartwick, Vermont. (Wood)
- Danville Stove & Mfg. Co., Danville, Pa.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Dravo Corporation, Pittsburgh.
- Excelsior Stove & Mfg. Co., Quincy, Ill.
- Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis.
- Green Colonial Furnace Co., Des Moines, Ia.
- Hart & Crouse Corporation, Utica, N. Y.
- Hart Mfg. Co., Louisville, Ky. (Coal and Gas)
- Heating Equipment Co., San Francisco. (Gas)
- Henry Furnace Company, Medina, Ohio.
- Hess-Snyder Co., Massillon, Ohio.
- Home Stove Co., Indianapolis.
- Homer Furnace & Foundry Corp., Coldwater, Mich.
- International Heater Co., Utica, N. Y.
- Kehm Corporation, Chicago, Ill.
- Keith Furnace Co., Des Moines, Ia.
- Kelsey Heating Co., Syracuse, N. Y.
- Koons Furnace Co., Danville, Ill.
- Little Burner Co., Inc., H. C., San Rafael, Calif. (Oil)
- MaGill Foundry and Furnace Works, P. H., Bloomington, Ill.
- Marshall Furnace Co., Marshall, Mich.
- May-Fiebeger Co., Newark, Ohio.
- Meyer Furnace Co., Peoria, Ill.
- Moncrief Furnace Co., Atlanta, Ga.
- Moore Corp., Joliet, Ill.
- Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- National Manufacturing & Engineering Co., Detroit.
- Nelson Corporation, Herman, Moline, Ill.
- Nesbitt, Inc., John J., Philadelphia.
- Orbon Stove Co., Belleville, Ill.
- Patten Co., J. V., Sycamore, Ill. (Coal, Oil and Gas)
- Payne Furnace & Supply Co., Beverly Hills, Calif.
- Perfection Stove Co., Cleveland. (Oil)
- Pittston Stove Co., Pittston, Pa.

• Advertisement in this issue. See Index to Advertisers, page 324.

- Portland Stove Foundry Co., Portland, Me.
- Premier Furnace Co., Dowagiac, Mich.
- Reynolds Manufacturing Co., Springfield, Mo.
- Reznor Mfg. Co., Mercer, Pa.
- Rock Island Stove Co., Rock Island, Ill.
- Round Oak Co., Dowagiac, Mich.
- Royal Air Conditioning Equip. Co., Alhambra, Calif.
- Rudy Furnace Co., Dowagiac, Mich.
- St. Clair Foundry Corp., Centralia, Ill.
- Sioux City Foundry and Boiler Co., Sioux City, Ia.
- Stainless & Steel Products Co., St. Paul, Minn.
- Syncromatic Corporation, Milwaukee.
- Tennessee Enamel Mfg. Co., Nashville, Tenn. (Gas)
- Twentieth Century Heating & Ventilating Co., Akron, O.
- Waterman-Waterbury Co., Minneapolis, Minn. (Coal, Oil and Wood)
- Western Blower Co., Seattle, Wash.
- Williamson Heater Co., Cincinnati.
- Wise Furnace Co., Akron, O.
- XXth Century Heating & Ventilating Co., Akron, O.

HEATERS, WATER, OIL-FIRED

- Airtemp Division, Chrysler Corp., Dayton, O.
- Aldrich Company, Wyoming, Ill.
- American Gas Machine Company, Albert Lea, Minn.
- Anchor Post Fence Co., Heating Div., Baltimore.
- Auburn Burner Company, Auburn, Ind.
- Automatic Burner Corporation, Chicago.
- Automatic Humidifier Co., Cedar Falls, Iowa.
- Century Engineering Corporation, Cedar Rapids, Iowa.
- Cleveland Steel Products Corp., Torridheet Div., Cleveland.
- Coleman Lamp & Stove Co., Wichita, Kan.
- Dahquist Mfg. Co., Inc., Somerville, Mass.
- Day & Night Manufacturing Co., Monrovia, Calif.
- Delco Appliance Div., General Motors Corp., Rochester, N. Y.
- Duo-Therm Div., Motor Wheel Corporation, Lansing, Mich.
- Electrol Mfg. Co., Passaic, N. J.
- Florence Stove Co., Gardner, Mass.
- Gerstein & Cooper Co., South Boston, Mass.
- Gillen Company, J. L., Dowagiac, Mich.
- Hotstream Heater Co., Cleveland.
- Johnson Co., S. T., Oakland, Cal.
- Kleen-Heat, Inc., Chicago.
- Kresky Mfg. Co., Petaluma, Calif.
- Loneragan Manufacturing Co., Albion, Mich.
- Michigan Tank & Furnace Corp., Lochinvar Products Div., Detroit. (Multiple Stage)
- National Airoil Burner Co., Inc., Philadelphia.
- Nu-Way Corp., Rock Island, Ill.
- Ohio Foundry & Mfg. Co., Steubenville, Ohio.
- Pacific Steel Boiler Div., United States Radiator Corp., Detroit.
- Pan-American Engineering Company, Berkeley, Calif.
- Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
- Perfection Stove Co., Inc., Cleveland.
- Petroleum Heat & Power Co., Stamford, Conn.
- Preferred Utilities Mfg. Corp., New York City.
- Quaker Manufacturing Co., Chicago.
- Quincy Stove Mfg. Co., Quincy, Ill.
- Ray Oil Burner Company, San Francisco.
- Relf-Rexoil, Inc., Buffalo.
- Scott-Newcomb, Inc., St. Louis.
- Taco Heaters, Inc., New York City.
- Timken Silent Automatic Div., Timken-Detroit Axle Co., Detroit.
- United States Radiator Corporation, Detroit.
- Viking Mfg. Corp., Dayton, Ohio.
- Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
- York-Heat Div., York-Shipley, Inc., York, Pa.

HEATERS, WATER, STOKER-FIRED

- Catskill Metal Works, Inc., Catskill, N. Y.
- Gehl Bros. Mfg. Co., West Bend, Wis.
- Pan-American Engineering Company, Berkeley, Calif.
- Rheem Manufacturing Co., Stokermatic Div., Salt Lake City.
- Schwitzer-Cummins Co., Indianapolis.

HEATERS, WATER, STORAGE, GAS

- American Radiator & Standard Sanitary Corp., Pittsburgh.
- Crane Company, Chicago.
- Dahquist Mfg. Co., Inc., Somerville, Mass.
- Day & Night Manufacturing Co., Monrovia, Calif.
- Handley Brown Heater Co., Jackson, Mich.
- Hotstream Heater Co., Cleveland.
- Mission Water Heater Co., Los Angeles.
- Schoedinger, F. O., Columbus, Ohio.
- Pan American Engineering Co., Berkeley, Calif.
- Security Manufacturing Co., Kansas City.
- Smith Corporation, A. O., Milwaukee.

HEATING COILS

See Coils, Heating

HOSE, METAL, FOR ELIMINATING COMPRESSOR VIBRATION

- Aeroquip Corp., Jackson, Mich.
- American Metal Hose Branch, American Brass Co., Waterbury, Conn.
- Atlantic Metal Hose Co., Inc., New York City.
- Chicago Metal Hose Corporation, Maywood, Ill.
- Eclipse Aviation, Div., Bendix Aviation Corp., Bendix, N. J.

- Everhot Products Co., Chicago, Ill.
- Packless Metal Products Corp., New Rochelle, N. Y.
- Pennsylvania Flexible Metallic Tubing Co., Philadelphia.
- Seamlex Co., Long Island City, N. Y.
- Titeflex, Inc., Newark, N. J.
- United Metal Hose Co., Inc., Long Island City, N. Y.
- Zallas Brothers & Johnson, Wilmington, Del.

HOUSINGS, BLOWER

- Air Controls, Inc., Cleveland.
- Brundage Co., Kalamazoo, Mich.
- Clarage Fan Co., Kalamazoo, Mich.
- Commercial Shearing & Stamping Co., Youngstown, Ohio.
- Dahlstrom Metallic Door Co., Jamestown, N. Y.
- Detroit Stamping Co., Detroit.
- Economy Electric Mfg. Co., Cicero, Ill.
- Hastings Air Conditioning Co., Inc., Hastings, Nebr.
- Lau Blower Co., Dayton, O.
- Martin Fan & Blower Co., Chicago.
- National Manufacturing & Engineering Co., Detroit.
- Northern Blower Co., Cleveland.
- Royal Air Conditioning Equipment Co., Alhambra, Cal.
- Sandberg Co., H. J., Portland, Ore.
- Schwitzer-Cummins Co., Indianapolis.
- Sturtevant Co., B. F., Hyde Park, Boston.
- Torrington Mfg. Co., Torrington, Conn.
- U. S. Air Conditioning Corp., Minneapolis.
- Utica Products, Incorporated, Utica, N. Y.
- Viking Air Conditioning Corp., Cleveland.

HOUSINGS, FAN, PROPELLER

- Commercial Shearing & Stamping Co., Youngstown, Ohio. (Venturi type)
- Dahlstrom Metallic Door Co., Jamestown, N. Y.
- DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
- Northern Blower Co., Cleveland.
- Schwitzer-Cummins Company, Indianapolis.

HUMIDIFIER FITTINGS

See Fittings, Humidifier, Water Line

HUMIDIFIER VALVES

See Valves, Humidifier, Water Level

HUMIDIFIERS, FURNACE, EVAPORATION, AUTOMATIC

- Agricola Furnace Co., Inc., Gadsden, Ala.
- American Air Conditioning Co., Minneapolis.
- Automatic Humidifier Co., Cedar Falls, Ia.
- Badger Corporation, Milwaukee.
- Barclay, Inc., Robert, Chicago.
- Bard Manufacturing Company, Bryan, Ohio.
- Cary Mfg. Co., Waupaca, Wis.
- Chandler Co., Cedar Rapids, Ia.
- Cleveland Humidifier Co., Cleveland.
- Des Moines Stove Repair Co., Des Moines, Ia.
- Glasby Manufacturing Company, Inc., J. P., Bloomfield, N. J.
- Green Colonial Furnace Co., Des Moines, Ia.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Ideal Furnace Co., Detroit, Mich.
- Iowa Foundry Co., Sioux City, Ia.
- Kraker, Henry, Holland, Mich.
- Little Burner Co., Inc., H. C., San Rafael, Calif.
- McDonnell & Miller, Chicago.
- Maid-O'-Mist, Inc., Chicago.
- Marshall Furnace Co., Marshall, Mich.
- Mayflower Air-Conditioners, Inc., St. Paul.
- Meyer Furnace Co., Peoria, Ill.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Nugent Furnaces, Thomas, New York City.
- Olsen Manufacturing Co., C. A., Elyria, Ohio.
- Patten Co., J. V., Sycamore, Ill.
- Pennsylvania Furnace & Iron Co., Warren, Pa.
- Pfening Co., Fred D., Columbus, Ohio.
- Premier Furnace Co., Dowagiac, Mich.
- Round Oak Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- Sioux City Foundry and Boiler Co., Sioux City, Ia.
- Skilbeck Mfg. Co., Kenosha, Wis.
- Skuttle Manufacturing Co., Detroit.
- Somers, Inc., H. J., Detroit, Mich.
- Thatcher Furnace Co., Garwood, N. J.
- Viking Air Conditioning Corp., Cleveland.
- Western Blower Co., Seattle, Wash.

HUMIDIFIERS, FURNACE, SPRAY, AUTOMATIC

- Air Controls, Inc., Cleveland.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Radiator and Standard Sanitary Corp., Pittsburgh.
- Binks Mfg. Co., Chicago.
- Bishop & Babcock Mfg. Co., Cleveland.
- Electric Sprayit Company, Sheboygan, Wis.
- Handelman Washed Air Co., Minneapolis.
- Hubbard Company, Minneapolis.
- Mayflower Air-Conditioners, Inc., St. Paul.
- Meyer Furnace Co., Peoria, Ill.
- Somers, Inc., H. J., Detroit, Mich.
- Spray Engineering Co., Somerville, Mass.

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Spraying Systems Company, Chicago.
 Supreme Electric Products Corp., Rochester, N. Y.
 Thatcher Furnace Co., Garwood, N. J.

HUMIDIFIERS, UNIT, ROOM TYPE (Without Heating)

- Bahnson Co., Winston-Salem, N. C.
- Chelsea Fan & Blower Co., Inc., Irvington, N. J.
- Comfort Products Corporation, Harvey, Ill.
- General Air Conditioning Corp., Cincinnati.
- Handelan Washed Air Co., Minneapolis.
- Kauffman Air Conditioning Corp., St. Louis.
- Lion Mfg. Corp., Chicago.
- Marley Company, Kansas City, Kansas.
- Norwood Filtration Co., The, Florence, Mass.
- Pfening Company, Fred D., Columbus, Ohio. (Industrial)
- Skilbeck Mfg. Co., Kenosha, Wis.
- Somers, Inc., H. J., Detroit.
- Standard Engineering Works, Pawtucket, R. I.
- Steamair Co., Cincinnati, Ohio.
- U. S. Air Conditioning Corp., Minneapolis.

HUMIDISTATS

- American Moistening Co., Providence, R. I.
- Au-Temp-Co., Corp., New York City.
- Bahnson Co., Winston-Salem, N. C.
- Barber-Colman Co., Rockford, Ill.
- Bristol Co., Waterbury, Conn.
- Detroit Lubricator Co., Detroit, Mich.
- Friez Instrument Division, Towson, Md. (Human Hair)
- H-B Instrument Co., Inc., Philadelphia, Pa.
- Johnson Service Co., Milwaukee, Wis. (Wood, Hair, Membrane)
- Minneapolis-Honeywell Regulator Co., Minneapolis (Human hair)
- Parks-Cramer Co., Fitchburg, Mass.
- Penn Electric Switch Co., Goshen, Ind.
- Powers Regulator Co., Chicago.
- Sarcotherm Controls, Inc., Chicago.
- Standard Engineering Works, Pawtucket, R. I.
- Tagliabue Mfg. Co., C. J., Brooklyn.

HUMIDITY CONTROLS

See Humidistats

HUMIDITY RECORDERS

See Recorders, Humidity

HYGROMETERS

- American Moistening Co., Providence, R. I.
- Bristol Co., Waterbury, Conn.
- Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia.
- Elmer & Amend, New York City.
- Fee and Stemwedel, Inc., Chicago.
- Foxboro Co., Foxboro, Mass.
- Friez Instrument Division, Towson, Md.
- G. M. Manufacturing Co., New York City.
- H. B. Instrument Co., Inc., Philadelphia.
- Hill, E. Vernon, Chicago.
- International Moistening Co., Providence, R. I.
- Johnson Service Co., Milwaukee, Wis.
- Leeds & Northrup Co., Philadelphia. (Recording)
- Moeller Instrument Co., Richmond Hill, New York City.
- Palmer Co., Cincinnati.
- Parks-Cramer Co., Fitchburg, Mass.
- Precision Thermometer and Instrument Co., Philadelphia.
- Scientific Instrument Co., Detroit.
- Standard Thermometer, Inc., Boston.
- Tagliabue Mfg. Co., C. J., Brooklyn.
- Taylor Instrument Companies, Rochester, N. Y.
- Terlice Co., H. O., Detroit.
- Weksler Thermometer Corp., New York City.

INDICATORS, SOUND LEVEL

- General Electric Co., Schenectady, N. Y.

INSULATING CEMENT

See Cement, Insulating

INSULATING WINDOWS, HEAT

See Windows, Heat Insulating

INSULATION, BUILDING

- Acme Asbestos Covering & Flooring Co., Chicago. (Rockwool)
- Air-O-Cell Industries, Inc., Detroit.
- Alfol Insulation Co., Inc., New York City. (Blanket)
- Alton Mineral Wool Insulation Co., Alton, Ill.
- Aluminum Company of America, Pittsburgh. (Reflective foil)
- American Flange & Mfg. Co., Inc., New York City. (Metal Sheets)
- American Hair & Felt Co., Chicago. (Hair)
- Armstrong Cork Co., Lancaster, Pa. (Cork)
- Bache & Co., Semon, New York City. (Glass)
- Baldwin-Hill Co., Trenton, N. J. (Rockwool)
- Barrett Division, Allied Chemical & Die Corporation, New York City. (Tar felt and rockwool)
- Blocksom & Company, Michigan City, Ind.
- Cabot, Inc., Samuel, Boston.
- Carey Co., Phillip, Lockland, Cincinnati, O. (Rockwool)
- Carney Rockwool Co., Mankato, Minn. (Granulated, Loose, and Batt)

Celotex Corp., Chicago.

- Chamberlin Metal Weather Strip Co., Detroit. (Rock wool)
- Coast Insulating Corp., Los Angeles. (Rockwool Batts, Fill)
- Cork Import Corp., New York City. (Corkboard) (Mineral Wool Board)
- Cork Insulation Co., New York City. (Cork)
- Doheny Co., John J., Belmont, Mass. (Blanket)
- Dry-Zero Corporation, Chicago. (Blanket and Bound Batt)
- Eagle-Picher Lead Co., Cincinnati, O. (Mineral wool)
- Ehret Magnesia Mfg. Co., Valley Forge, Pa.
- Fir-Tex Insulating Board Co., St. Helens, Ore. (Wood fibre-board)
- Flintkote Co., New York City. (Fibre board and rockwool)
- Ford Roofing Products Co., Chicago. (Board and rockwool)
- General Electric Co., Plastics Div., Pittsfield, Mass.
- General Insulating Products Co., Brooklyn, N. Y.
- Hinde & Dauch Paper Co., Sandusky, O. (Air-Cell)
- Insul-Wool Insulation Corp., Wichita, Kansas.
- Insulite Div. Minnesota and Ontario Paper Co., Minneapolis. (Wood fibre)

- International Vermiculite Co., Girard, Ill. (Loose fill)
- Jiffy Manufacturing Co., Hillside, N. J. (Blanket)
- Johns-Manville, New York City. (Rock wool, fibre board)
- Johnston Tin Foil & Metal Co., St. Louis. (Paper backed foil)
- Keasbey & Mattison Co., Ambler, Pa.
- Keasbey Co., Robert A., New York City. (Rock wool)
- Kennedy, Inc., David E., Brooklyn, N. Y. (Board)
- Kimberly-Clark Corp., Neenah, Wis. (Expanding Blanket)
- Ludowici-Celadon Co., Chicago. (Wool)
- Marblehead Lime Co., Chicago. (Rock wool)
- Masonite Corp., Chicago, Ill. (Sheathing, Lath, Tile, Plank, Blanket, Finish Panels)
- Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
- Mitchell & Smith, Inc., Mineral Felt Div., Detroit. (Cork, Rock Wool)
- Multi-Cell Sales Corp., Minneapolis (Quilted Newspaper Blanket)
- Mundet Cork Corp., Brooklyn, N. Y. (Cork)
- Munn and Steele, Inc., Newark, N. J. (Vermiculite)
- National Gypsum Co., Buffalo, N. Y. (Rock Wool and Board)
- Nelson Mfg. Co., B. F., Minneapolis (Vermiculite)
- Owens-Corning Fiberglas Corporation, Toledo. (Board and Blanket)
- Pacific Lumber Co., San Francisco. (Loose fill)
- Pacific States Felt & Mfg. Co., Inc., San Francisco.
- Pittsburgh Plate Glass Co., Pittsburgh. (Cellular Glass)
- Plant Rubber & Asbestos Works, Inc., San Francisco.
- Plastergon Wall Board Co., Buffalo. (Mineral Wool and Rigid Board)
- Poe Co., C. W., Cleveland. (Mineral Wool)
- Refractory & Insulation Corp., New York City. (Mineral wool, loose granulated)
- Reynolds Metals Co., Richmond, Va. (Reflective)
- Riverton Lime & Stone Co., Inc., Riverton, Va. (Mineral Wool)
- Robinson Insulation Co., Great Falls, Mont. (Loose Fill)
- Rock Fleece Co., El Paso, Texas. (Fill)
- Ruberoid Co., New York City. (Rock wool)
- Samson Plaster Board Co., Buffalo. (Fill, batts, blankets, foil, board)
- Silvercote Products, Inc., Chicago. (Reflective fabric)
- Specialty Converters, Inc., East Braintree, Mass. (Reflective)
- Sprayo-Flake Co., Chicago.
- Standard Asbestos Mfg. Co., Chicago. (Asbestos, hair-felt)
- Standard Lime & Stone Co., Baltimore, Md. (Rock wool)
- Standard Rolling Mills, Incorporated, Brooklyn. (Reflective)
- Tennessee Products Corp., Nashville, Tenn. (Mineral Wool)
- Therminsul Corp. of America, Kalamazoo, Mich. (Batts, bulk, granulated)
- Truscon Steel Co., Youngstown, O. (Board between metal sheets)
- United Cork Companies, Kearney, N. J.
- United States Gypsum Co., Chicago, Ill. (Wool and board)
- United States Mineral Wool Co., Chicago. (Rock wool)
- U. S. Rock Wool Co., Salt Lake City. (Granulated, Batt and Blanket)
- Universal Gypsum & Lime Co., Chicago. (Loose fill)
- Universal Zonolite Insulation Co., Chicago. (Loose Fill, Plaster)
- Waukesha Lime & Stone Co., Waukesha, Wis. (Rock Wool batts and bulk)
- Western Mineral Products Co., Omaha, Nebr. (Fill)
- Western Rock Wool Corp., Huntington, Ind. (Fill)
- Wilson & Co., Inc., Chicago, Ill. (Flexible, Blanket, Board)
- Wilson, Inc., Grant, Chicago, Ill. (Rock Wool)
- Wood Conversion Co., St. Paul, Minn. (Board and blanket)

INSULATION, DUCT, SOUND DEADENING

- American Hair & Felt Co., Chicago, Ill. (Hair Felt)
- Baldwin-Hill Company, Trenton, N. J. (Rockwool, block)
- Barrett Division, Allied Chemical & Die Corporation, New York.
- Cabot, Inc., Samuel, Boston.
- Celotex Corp., Chicago.
- Ehret Magnesia Mfg. Co., Valley Forge, Pa.
- Felters Co., Boston.
- Insulite Div. Minnesota and Ontario Paper Co., Minneapolis.
- Johns-Manville, New York
- Keasbey Co., Robert A., New York.
- Kimberly-Clark Corp., Neenah, Wis.
- Mortell Co., J. W., Kankakee, Ill. (Adhesive)
- Owens-Corning Fiberglas Corporation, Toledo. (Board and Blanket)

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- Pacific States Felt & Mfg. Co., Inc., San Francisco.
- Plant Rubber & Asbestos Works, Inc., San Francisco.
- Reynolds Metals Co., Richmond, Va.
- Telsit Insulation Co., Bronx, N. Y. (Plastic)
- United States Rubber Co., 1230 Sixth Ave., New York City.
- Universal Zonolite Insulation Co., Chicago. (Cement)
- Western Felt Works, Chicago.
- Western Silicair Products, Inc., Burbank, Cal.
- Wilson, Inc., Grant, Chicago.

INSULATION, DUCT, THERMAL

- Acme Asbestos Covering & Flooring Co., Chicago.
- Air-O-Cel Industries, Inc., Detroit.
- Alfol Insulation Co., Inc., New York City. (Aluminum foil)
- American Flange & Mfg. Co., Inc., New York.
- American Hair & Felt Co., Chicago.
- Armstrong Cork Co., Lancaster, Pa.
- Baldwin-Hill Co., Trenton, N. J. (Blanket)
- Barrett Division, Allied Chemical & Die Corporation, New York City. (Rock Wool)
- Cabot, Inc., Samuel, Boston.
- Carey Co., Philip, Lockland, Ohio.
- Celotex Corp., Chicago.
- Cork Import Corp., New York City. (Corkboard)
- Cork Insulation Co., Inc., New York City. (Cork)
- Dry-Zero Corporation, Chicago.
- Eagle-Picher Lead Co., Cincinnati, O. (Mineral wool, block, blanket)
- Ehret Magnesia Mfg. Co., Valley Forge, Pa.
- Felters Co., Boston.
- Fir-Tex Insulating Board Co., St. Helena, Ore.
- General Insulating Products Co., Brooklyn.
- Goodrich Company, B. F., Akron, Ohio.
- Hinde & Dauch Paper Co., Sandusky, Ohio.
- Insulite Div. Minnesota and Ontario Paper Co., Minneapolis
- International Vermiculite Co., Girard, Ill. (Block)
- Johns-Manville, New York City.
- Kearbey Co., Robert A., New York City.
- Kearbey & Mattison Co., Ambler, Pa. (85% Magnesia—Pipe and Blocks)
- Kennedy, Inc., David E., Brooklyn. (Cork)
- Keystone Asphalt Products Co., Chicago.
- Kimberly-Clark Corp., Neenah, Wis. (Expanding Blanket)
- Masonite Corporation, Chicago.
- Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
- Mitchell & Smith, Inc., Mineral Felt Div., Detroit. (Cork)
- Mortell Co., J. W., Kankakee, Ill.
- Mundet Cork Corp., Brooklyn. (Cork)
- Munn and Steele, Inc., Newark, N. J. (Plastic)
- National Gypsum Co., Buffalo. (Rock Wool)
- Norristown Magnesia & Asbestos Co., Norristown, Pa.
- Owens-Corning Fiberglas Corp., Toledo. (Board and Blanket)
- Pacific States Felt & Mfg. Co., Inc., San Francisco.
- Pittsburgh Plate Glass Co., Pittsburgh, Pa. (Cellular Glass)
- Plant Rubber & Asbestos Works, Inc., San Francisco.
- Poe Co., C. W., Cleveland.
- Quigley Co., Inc., New York City.
- Refractory & Insulation Corp., New York City. (Inside Duct Lining).
- Reynolds Metals Co., Richmond, Va.
- Robinson Insulation Co., Great Falls, Mont.
- Rock Fleece Co., El Paso, Tex.
- Ruberoid Co., New York City. (Cellular).
- Sall Mountain Co., Chicago.
- Schundler & Co., Inc., F. E., Joliet, Ill.
- Smith & Kanzler Corp., Elizabeth, N. J. (Asbestos Air Cell)
- Sprayo-Flake Co., Chicago.
- Standard Asbestos Mfg. Co., Chicago.
- Telsit Insulation Co., Bronx, New York City.
- Therminul Corp., Kalamazoo, Mich. (Block rock wool)
- United Cork Companies, Kearney, N. J.
- United States Mineral Wool Co., Chicago. (Rock wool)
- Universal Zonolite Insulation Co., Chicago. (Cement and Blocks)
- Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
- Western Felt Works, Chicago.
- Wilson & Co., Inc., Chicago. (Flexible, fire resisting)
- Wilson, Inc., Grant, Chicago.
- Wood Conversion Co., St. Paul, Minn.

INSULATION, FURNACE

- Acme Asbestos Covering & Flooring Co., Chicago. (Asbestos, Rock wool)
- Alfol Insulation Co., Inc., New York City.
- Baldwin-Hill Co., Trenton, N. J. (Rock Wool Block & Cement)
- Carey Co., Philip, Lockland, Ohio.
- Coast Insulating Corp., Los Angeles. (Rock Wool Cement)
- Eagle-Picher Lead Co., Cincinnati, O. (Blocks)
- Ehret Magnesia Mfg. Co., Valley Forge, Pa.
- Green Fire Brick Co., A. P., Mexico, Mo. (Vermiculite)
- International Vermiculite Co., Girard, Ill. (Block Cement)
- Johns-Manville, New York City. (85% Magnesia).
- Kearbey Co., Robert A., New York (Asbestos)
- Krehbiel Co., J. H., Chicago. (Boller and Breech Covering)
- Ludowici-Celadon Co., Chicago. (Fire Brick)
- Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
- Mitchell & Smith, Inc., Mineral Felt Div., Detroit. (Rock Wool, Blocks)
- Munn and Steele, Inc., Newark, N. J. (Bonding)

- Nelson Mfg. Co., B. F., Minneapolis.
- Norristown, Magnesia & Asbestos Co., Norristown, Pa.
- Owens-Corning Fiberglas Corp., Toledo, O. (Blanket)
- Pacific States Felt & Mfg. Co., Inc., San Francisco.
- Plant Rubber & Asbestos Works, Inc., San Francisco. (Asbestos)
- Pilbrico Jointless Firebrick Co., Chicago. (Mineral Wool)
- Quigley Company, Inc., New York City.
- Refractory & Insulation Corp., New York City. (Block Blanket).
- Robinson Insulation Co., Great Falls, Mont. (High Temperature Cement)
- Ruberoid Co., New York City. (Blocks, Asbestos Cement).
- Schundler & Co., Inc., F. E., Joliet, Ill.
- Smith & Co., F. L., New York City.
- Smith & Kanzler Corp., Elizabeth, N. J.
- Standard Asbestos Mfg. Co., Chicago.
- Telsit Insulation Co., Bronx, N. Y.
- Therminul Corp., Kalamazoo, Mich. (Block rock wool)
- United States Mineral Wool Co., Chicago.
- Universal Zonolite Insulation Co., Chicago. (Cement, Bricks and Blocks)
- Wilson, Inc., Grant, Chicago.

KITCHEN FANS

See Fans, Kitchen

LACQUERS

See Enamels and Lacquers

LEADER STRAPS

See Fittings and Accessories, Conductor

LIFTS, SKYLIGHT

- Biersach & Niedermeyer Company, Milwaukee.
- Cincinnati Sheet Metal & Roofing Co., Cincinnati.
- Danzer Metal Works Co., Hagerstown, Md.
- Dayton Greenhouse Mfg. Co., Dayton, Ohio.
- Levow, David, New York City. (Gearing)
- Main Cornice Works, Los Angeles.
- Park City Cornice Works, Inc., Bridgeport, Conn.
- Royal-Apex Mfg. Corp., Brooklyn.
- Schoedinger, F. O., Columbus, Ohio.
- Sheet Metal Mfg. Co., Inc., Brooklyn.
- Van Noorden Co., E., Boston.
- Weiss & Co., H., New York City.

LOUVRES AND SHUTTERS, AUTOMATICALLY OR MANUALLY CONTROLLED

- Air Conditioning Products Co., Detroit.
- Air Control Products, Inc., Coopersville, Mich. (Attic and roof Ventilators)
- Air Controls, Inc., Cleveland.
- Air Conditioning Products Co., Detroit.
- Alrecon Industries Incorporated, Detroit.
- Airmaster Corp., Chicago.
- Allen Corp., Detroit.
- American Coolair Corp., Jacksonville, Fla.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Warming & Ventilating Co., Toledo, Ohio.
- Ames Co., W. R., San Francisco.
- Arex Co., Chicago.
- Barber-Coleman Company, Rockford, Ill.
- Belco Exhaust Fan Mfg. Co., St. Louis.
- Biersach & Niedermeyer Co., Milwaukee.
- Bishop & Babcock Mfg. Co., Cleveland.
- Buffalo Forge Co., Buffalo.
- Burt Mfg. Co., Akron, Ohio.
- Campbell Heating Co., E. K., Kansas City, Mo.
- Champion Blower & Forge Co., Lancaster, Pa.
- Chelsea Fan & Blower Co., Inc., Irvington, N. J.
- Chicago Metal Mfg. Co., Chicago.
- Circulators & Devices Mfg. Corp., New York City. (Automatic and Manual)
- Clay Equipment Corp., Cedar Falls, Ia.
- Decatur Iron & Steel Co., Decatur, Ala.
- Dual-Air Fan Corporation, Chicago.
- Economy Electric Manufacturing Co., Cicero, Ill.
- Electrovent Fan & Mfg. Co., Chicago.
- Elgo Shutter & Mfg. Co., Detroit.
- Gillman Mfg. Co., Detroit.
- Guth Co., Edwin F., St. Louis.
- Hirschman Co., Inc., W. F., Buffalo.
- International Engineering, Inc., Dayton, Ohio.
- International Steel Company, Evansville, Ind.
- Jamieson Mfg. Co., Dallas, Tex.
- Johnson Fan & Blower Corp., Chicago.
- Johnston Co., Wm. W., Dayton, Ohio.
- Jordan & Co., Paul R., Indianapolis.
- Kelvin-White Co., Boston.
- King Ventilating Co., Owatonna, Minn.
- Kirk & Blum Mfg. Co., Cincinnati.
- Klee Co., George B., Cincinnati.
- Lau Blower Co., Dayton, O.
- Leslie Welding Co., Chicago.
- Lockjoint Wood Products Co., Wichita, Kan. (Wood; stationary door, wall, window and ceiling)
- Martin Fan & Blower Co., Chicago.
- Maysteel Products, Inc., Mayville, Wis.
- Meier Electric & Machine Co., Indianapolis.
- Meyer Mfg. Co., Detroit.

• Advertisement in this issue. See Index to Advertisers, page 324.

- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Myers Electric Co., Pittsburgh.
- Nelson Corporation, Herman, Moline, Ill.
- Peerless Electric Co., Warren, Ohio.
- Reed Unit-Fans, Inc., New Orleans.
- Richmond Fireproof Door Company, Richmond, Ind.
- Riffin Metal Products, Kankakee, Ill.
- Robertson Co., H. H. Pittsburgh.
- Schoedinger, F. O., Columbus, Ohio.
- Signal Electric Mfg. Co., Menominee, Mich.
- Southbridge Roofing Co., Inc., Southbridge, Mass.
- Standard Stamping & Perforating Co., Chicago.
- Sturtevant Co., B. F., Hyde Park, Boston.
- Tuttle & Bailey, Inc., New Britain, Conn.
- United States Register Co., Battle Creek, Mich.
- Utility Appliance Corporation, Los Angeles.
- Van Noorden Co., E., Boston.
- Victor Electric Products, Inc., Cincinnati.
- Waterloo Register Co., Waterloo, Ia.

MACHINERY, REBUILT AND USED

- Biggs Supply Co., B. C., Lincoln, Nebr.
- Brooks Co., Inc., B. R., Boston 10.
- Central-West Machinery Co., Chicago.
- General Blower Co., Chicago.
- Hyman & Sons, Joseph, Philadelphia.
- Interstate Machinery Co., Inc., Chicago.
- Maplewood Machinery Co., Chicago.
- Osborn Co., J. M. & L. A., Cleveland.
- Reiner & Campbell Co., Inc., Elizabeth, N. J.
- St. Louis Tool Co., St. Louis.

MACHINES, BAR FOLDERS, HAND

- Barth Mfg. Co., Milldale, Conn.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- St. Louis Tool Co., St. Louis.

MACHINES, BAR FOLDERS, POWER

- Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, BEADING, HAND

- Barth Mfg. Co., Milldale, Conn.
- Kraus Mfg. Co., Charles E., Louisville, Ky.
- Niagara Machine & Tool Works, Buffalo.
- Packham Crimper Co., Mechanicsburg, Ohio.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Robertson, F. L., Buffalo.

MACHINES, BEADING, POWER

- Callahan Can Machine Co., Inc., Brooklyn.
- Maplewood Machinery Co., Chicago.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Swain Mfg. Co., Fred J., St. Louis.
- Whiting Corp., Harvey, Ill.
- Yoder Co., Cleveland.

MACHINES, BURRING, HAND

- Barth Mfg. Co., Milldale, Conn.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, BURRING, POWER

- Cincinnati Electrical Tool Co., The, Cincinnati.
- Independent Pneumatic Tool Co., Chicago.
- Maplewood Machinery Co., Chicago.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Stow Mfg. Co., Binghamton, N. Y.
- Yoder Co., Cleveland.

MACHINES, CLEAT BENDING, HAND

- Smith, R. E., Waukegan, Ill.

MACHINES, COMBINATION, HAND

(Beading, Burning, Turning, Wiring, etc.)

- Barth Mfg. Co., Milldale, Conn.
- Maplewood Machinery Co., Chicago.
- Niagara Machine & Tool Works, Buffalo.
- Packham Crimper Co., Mechanicsburg, Ohio. (Beading—Rotary Snips)
- Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, COMBINATION, POWER

(Beading, Burring, Turning, Wiring, etc.)

- Maplewood Machinery Co., Chicago.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Whiting Corp., Harvey, Ill.
- Wysong & Miles Co., Greensboro, N. C.

MACHINES, CRIMPING, HAND

- Barth Mfg. Co., Milldale, Conn.
- C-B Tool Co., Lancaster, Pa.
- Kraus Mfg. Co., Charles E., Louisville, Ky.
- Niagara Machine & Tool Works, Buffalo.
- Packham Crimper Co., Mechanicsburg, Ohio.

- Peck, Stow & Wilcox Co., Southington, Conn.
- Service Machine Co., Elizabeth, N. J.

MACHINES, CRIMPING, POWER

- Maplewood Machinery Co., Chicago.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Streine Tool & Mfg. Co., New Bremen, Ohio.
- Whiting Corporation, Harvey, Ill.

MACHINES, DOUBLE SEAMER, ROOF, POWER

- Maxfield Manufacturing Co., Temple, Tex.
- Niagara Machine & Tool Works, Buffalo.
- Streine Tool & Mfg. Co., New Bremen, Ohio.

MACHINES, ELBOW, HAND

- Barth Mfg. Co., Milldale, Conn.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, ELBOW, POWER

- Maplewood Machinery Co., Chicago.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, FILING

- Continental Machines, Incorporated, Minneapolis.

MACHINES, FLANGING, HAND

- Barth Mfg. Co., Plantsville, Conn.
- Excelsior Tool & Machine Co., East St. Louis, Ill.
- Lockformer Co., Chicago.
- Maplewood Machinery Co., Chicago.
- Niagara Machine & Tool Works, Buffalo.
- "Original" Metal Flanging Machine Works, Seattle, Wash.
- Packham Crimper Co., Mechanicsburg, Ohio.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Ward Machinery Co., Chicago.
- Weiss & Co., H., New York.

MACHINES, FLANGING, POWER

- Callahan Can Machine Co., Inc., Brooklyn.
- Cleveland Punch & Shear Works Co., Cleveland.
- Lockformer Co., Chicago.
- Maplewood Machinery Co., Chicago.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Riverside Machinery Company, Chicago.
- Swain Mfg. Co., Fred J., St. Louis.
- Whiting Corp., Harvey, Ill.

MACHINES, GROOVING, HAND

- Barth Mfg. Co., Milldale, Conn.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, GROOVING, POWER

- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, GUTTER FORMING, HAND

- Robertson, F. L., Buffalo.

MACHINES, NIBBLING, HAND

- National Machine Tool Co., Racine, Wis.

MACHINES, NIBBLING, POWER

- Campbell, Andrew C., Div. of American Chain & Cable Co., Inc., Bridgeport, Conn.
- Independent Pneumatic Tool Co., Chicago. (Portable)
- Libert Machine Co., Green Bay, Wis.
- St. Louis Tool Co., St. Louis.
- Savage Co., W. J., Knoxville, Tenn.
- Service Machine Co., Elizabeth, N. J.

MACHINES, PIPE, LOCK FORMING, POWER

- Lockformer Co., Chicago.
- Maplewood Machinery Co., Chicago.

MACHINES, PITTSBURGH LOCK FORMING

- Dahlstrom Machine Works, Chicago.
- Lockformer Co., Chicago.
- Maplewood Machinery Co., Chicago.
- Rafter Machine Co., Belleville, N. J.
- Whitney Metal Tool Co., Rockford, Ill.

MACHINES, PITTSBURGH LOCK OPENERS

- Atlas Machine & Tool Co., Portland, Ore.
- Maplewood Machinery Co., Chicago.

MACHINES, ROLLING, CRIMPING, BEADING, POWER

- Maplewood Machinery Co., Chicago.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

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MACHINES, SEAMING, HAND

- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Weiss & Co., H., New York.

MACHINES, SEAMING, POWER

- Callahan Can Machine Co., Inc., Brooklyn.
- Lockformer Co., Chicago.
- Maplewood Machinery Co., Chicago.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Streine Tool & Mfg. Co., New Bremen, Ohio.
- Swain Mfg. Co., Fred J., St. Louis.

MACHINES, SETTING DOWN, HAND

- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, SETTING DOWN, POWER

- Callahan Can Machine Co., Inc., Brooklyn.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, SLIP ROLL FORMING, HAND

- Barth Mfg. Co., Milldale, Conn.
- Bertsch & Co., Cambridge City, Ind.
- Hendley & Whittemore Co., Beloit, Wis.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Wysong & Miles Co., Greensboro, N. C.

MACHINES, SLIP ROLL FORMING, POWER

- Bertsch & Co., Cambridge City, Ind.
- Hendley & Whittemore Co., Beloit, Wis.
- Maplewood Machinery Co., Chicago.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Wysong & Miles Co., Greensboro, N. C.
- Yoder Co., Cleveland.

MACHINES, SLITTING, HAND

- Barth Mfg. Co., Milldale, Conn.
- Bertsch & Co., Cambridge City, Ind.
- Beverly Shear Co., Chicago.
- Buffalo Forge Co., Buffalo.
- Hendley & Whittemore Co., Beloit, Wis.
- Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Rafter Machine Co., Belleville, N. J.
- Service Machine Co., Elizabeth, N. J.
- Ward Machinery Co., Chicago.
- Whitney Metal Tool Co., Rockford, Ill.

MACHINES, SLITTING, POWER

- Bertsch & Co., Cambridge City, Ind.
- Buffalo Forge Co., Buffalo.
- Callahan Can Machine Co., Inc., Brooklyn.
- Hendley & Whittemore Co., Beloit, Wis.
- Libert Machine Co., Green Bay, Wis. (Rotary)
- Maplewood Machinery Co., Chicago.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Rafter Machine Co., Belleville, N. J.
- St. Louis Tool Co., St. Louis.
- Streine Tool & Mfg. Co., New Bremen, Ohio.
- Whiting Corp., Harvey, Ill.
- Yoder Co., Cleveland.

MACHINES, SQUARING, POWER

- Bertsch & Co., Cambridge City, Ind.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Streine Tool & Mfg. Co., New Bremen, Ohio.
- Whitney Metal Tool Company, Rockford, Ill. (Shear)
- Wysong & Miles Co., Greensboro, N. C.

MACHINES, WIRING, HAND

- Barth Mfg. Co., Milldale, Conn.
- Maplewood Machinery Co., Chicago.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, WIRING, POWER

- Callahan Can Machine Co., Inc., Brooklyn.
- Cleveland Punch & Shear Works Co., Cleveland.
- Maplewood Machinery Co., Chicago.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Whiting Corp., Harvey, Ill.
- Yoder Co., Cleveland.

MALLETS, METAL WORKING

- Allen, Inc., Charles I., Pequabuck, Conn. (Hickory and Lignum Vitae)
- Berns Company, Otto, Rochester, N. Y. (Dogwood)
- Bersted Co., Martin, Chicago, Ill (Molded composition)

- Chicago Rawhide Mfg. Co., Chicago, Ill.
- Densewood Corporation, Elkhorn, Wis. (Wood)
- Electric Materials Co., North East, Pa. (Copper)
- Goodrich Company, B. F., Akron, Ohio. (Rubber)
- Greene, Tweed & Co., New York City.
- Lignum-Vitae Products Corp., Jersey City, N. J.
- Maplewood Machinery Co., Chicago. (Wood)
- New Plastic Corporation, Hollywood, Calif. (Plastic)
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn. (Wood)
- Reiner & Campbell Co., Inc., Elizabeth, N. J.
- Stanley Tools, New Britain, Conn. (Soft face hammers)
- Stossel & Sons Co., Carl, Front Royal, Va.
- Warren Handle Works Co., Cortland, Ohio.

MATS, FOR EVAPORATIVE COOLERS

- Adams Mattress Factory, Fort Worth, Tex.
- American Excelsior Corp., Chicago.
- Beckett & Co., Thomas, Dallas, Tex. (Aspen Fiber)
- Eugene Excelsior Company, Eugene, Oregon.
- Levy Bros. Company, Los Angeles.
- Morey, Dan, Los Angeles.

METAL CEILINGS

See Ceilings, Metal

METAL HOSE

See Hose, Metal

METAL PROTECTING

See Paint, Metal Protecting

METAL SPRAY GUNS

See Guns, Spray, Metals

METAL STAMPINGS

See Stampings, Metal

METALS, PERFORATED, SHEET AND PLATE

- Beckley Perforating Co., Garwood, N. J.
- Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
- Chicago Perforating Co., Chicago.
- Cross Engineering Co., Carbondale, Pa.
- Diamond Manufacturing Co., Wyoming, Pa.
- Erdle Perforating Co., Rochester, N. Y.
- Harrington & King Perforating Co., Chicago.
- Hendrick Mfg. Co., Carbondale, Pa.
- Johnston & Chapman Co., Chicago.
- Littleford Bros., Inc., Cincinnati.
- Manhattan Perforated Metal Co., Inc., Long Island City, N. Y.
- Mundt & Sons, Charles, Jersey City, N. J.
- Nortmann-Duffke Co., Milwaukee.
- Reliable Perforating Co., Chicago.
- Reverse Copper and Brass Incorporated, New York.
- Skinner Htg. & Vent. Co., Heater Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis.
- Standard Stamping & Perforating Co., Chicago.
- Wickwire Spencer Steel Co., New York City.

METERS, AIR VELOCITY, DIRECT READING

- Detroit Air Conditioning Service Co., Inc., Detroit.
- Hays Corporation, Michigan City, Ind.
- Illinois Testing Laboratories, Inc., Chicago.
- Taylor Instrument Companies, Rochester, N. Y.

MOTORS, DAMPERS, DUCT, MODULATING OR PROPORTIONING

- Au-Temp-Co Corp., New York City.
- Automatic Temperature Control Co., Inc., Philadelphia.
- Barber-Colman Co., Rockford, Ill.
- Bristol Co., Waterbury, Conn.
- Cook Electric Company, Chicago.
- Hotstream Heater Co., Cleveland.
- Mercoid Corporation, Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- White Manufacturing Co., St. Paul, Minn.

MOTORS, DAMPER, DUCT, TWO-POSITION

- Au-Temp-Co Corp., New York City.
- Automatic Products Co., Milwaukee.
- Automatic Temperature Control Co., Inc., Philadelphia.
- Barber-Colman Co., Rockford, Ill.
- Bristol Co., Waterbury, Conn.
- Cook Electric Co., Chicago.
- Mercoid Corporation, Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corp., Milwaukee.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- White Manufacturing Co., St. Paul, Minn.

MOTORS, DAMPERS, FURNACE DRAFT, ELECTRICAL

- Au-Temp-Co Corp., New York City.
- Automatic Products Co., Milwaukee.
- Automatic Temperature Control Co., Inc., Philadelphia, Pa.
- Barber-Colman Co., Rockford, Ill.
- Barclay, Inc., Robert, Chicago.
- Cook Electric Co., Chicago.
- Crise Electric Mfg. Co., Columbus, Ohio.

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- Defender Instrument & Regulator Co., St. Louis.
- Gleason-Avery, Inc., Auburn, N. Y.
- Janette Mfg. Co., Chicago 6.
- Merco Corporation, Chicago, Ill.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corporation, Milwaukee.
- Pioneer Heat Regulator Division, Master Electric Co., Dayton, O.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- White Manufacturing Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis.

MOTORS, ELECTRIC, FRACTIONAL H. P.

- Baldor Electric Co., St. Louis.
- Barber-Colman Co., Rockford, Ill. (A. C.)
- Bodine Electric Co., Chicago.
- Brown-Brockmeyer Co., Inc., Dayton, Ohio.
- Canatsey Electric Mfg. Co., Kansas City, Mo.
- Century Electric Co., St. Louis.
- Delco Appliance Div. General Motors Corp., Rochester, N. Y.
- Delco Products Division, General Motors Corp., Dayton, Ohio.
- Diehl Mfg. Co., Somerville, N. J.
- Dynamic Air Engineering, Inc., Los Angeles.
- Eastern Air Devices, Inc., Brooklyn.
- Electric Spray Co., Sheboygan, Wis.
- Emerson Electric Mfg. Co., St. Louis.
- Fairbanks, Morse & Co., Chicago.
- General Electric Co., Schenectady, N. Y.
- Hansen Mfg. Co., Inc., Princeton, Ind.
- Holtzer-Cabot Electric Co., Boston.
- Howell Electric Motors Co., Howell, Mich.
- Janette Mfg. Co., Chicago.
- Leland Electric Co., Inc., Dayton, Ohio.
- Marathon Electric Mfg. Corp., Wausau, Wis.
- Master Electric Co., Dayton, Ohio.
- Ohio Electric Mfg. Co., Cleveland.
- Packard Electric Div., General Motors Corp., Detroit.
- Peerless Electric Co., Warren, Ohio.
- Redmond Co., A. G., Owosso, Mich.
- Reynolds Electric Company, Chicago.
- Robbins & Myers, Inc., Springfield, Ohio.
- Russell Electric Co., Chicago.
- Signal Electric Mfg. Co., Menominee, Mich.
- Small Motors, Inc., Chicago.
- Smith Manufacturing Co., Inc., F. A., Rochester, N. Y.
- Speedway Mfg. Co., Cleero, Ill.
- Star Electric Motor Co., Bloomfield, N. J.
- Sterling Electric Motors, Inc., Los Angeles.
- Sturtevant Co., B. F., Hyde Park, Boston.
- U. S. Electrical Motors, Inc., Los Angeles.
- Victor Electric Products, Inc., Cincinnati.
- Wagner Electric Corp., St. Louis.
- Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

MOTORS, ELECTRIC, 1 H. P. AND OVER

- Allis-Chalmers Mfg. Co., Milwaukee.
- Allis Co., Louis, Milwaukee.
- Baldor Electric Co., St. Louis.
- Bogue Electric Co., Paterson, N. J.
- Brown-Brockmeyer Co., Inc., Dayton, Ohio.
- Burke Electric Co., Erie, Pa.
- Canatsey Electric Mfg. Co., Kansas City, Mo.
- Century Electric Co., St. Louis.
- Continental Electric Co., Inc., Newark, N. J.
- Crocker-Wheeler Elec. Mfg. Co., Amper, N. J.
- Delco Products Division, General Motors Corp., Dayton, Ohio.
- Diehl Mfg. Co., Somerville, N. J.
- Electric Machinery Mfg. Co., Minneapolis.
- Emerson Electric Mfg. Co., St. Louis.
- Fairbanks, Morse & Co., Chicago.
- General Electric Co., Schenectady, N. Y.
- Howell Electric Motors Co., Howell, Mich.
- Ideal Electric & Mfg. Co., Mansfield, Ohio.
- Imperial Electric Co., Akron, Ohio.
- Jackson Co., Byron, Los Angeles. (Submersible)
- Janette Mfg. Co., Chicago.
- Leland Electric Co., Inc., Dayton, Ohio.
- Marathon Electric Mfg. Corp., Wausau, Wis.
- Marble-Card Electric Co., Gladstone, Mich.
- Master Electric Co., Dayton, Ohio.
- Peerless Electric Co., Warren, Ohio.
- Philadelphia Gear Works, Inc., Philadelphia. (Geared)
- Reliance Elec. & Engr. Co., Cleveland.
- Robbins & Myers, Inc., Springfield, Ohio.
- Star Electric Motor Co., Bloomfield, N. J.
- Sterling Electric Motors, Inc., Los Angeles.
- Sturtevant Co., B. F., Hyde Park, Boston.
- U. S. Electrical Motors, Inc., Los Angeles.
- Wagner Electric Corp., St. Louis.
- Westinghouse Electric & Mfg. Co., East Pittsburgh.

MOTORS, TIMING

- Automatic Temperature Control Co., Inc., Philadelphia.
- Eastern Air Devices, Inc., Brooklyn.
- Hansen Mfg. Co., Inc., Princeton, Ind.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Paragon Electric Co., Chicago.
- Penn Electric Switch Co., Goshen, Ind.

MOULDING AND TRIM, ORNAMENTAL, for CABINETS and CASINGS

- Alden Manufacturing Co., Painesville, O.
- Allmetal Weatherstrip Co., Chicago.
- Aluminum Co. of America, Pittsburgh.
- Aluminum Goods Mfg. Co., Manitowoc, Wis.
- Brasco Manufacturing Co., Harvey, Ill.
- Briggs Mfg. Co., Detroit.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Dahlstrom Metallic Door Co., Jamestown, N. Y.
- Detroit Moulding Div., Detroit.
- Empire Door Co., Inc., New York City.
- Extruded Plastics, Inc., Norwalk, Conn.
- Friedley-Voshardt Co., Chicago.
- Green Mfg. Co., Chicago.
- Herron-Zimmers Moulding Co., Detroit.
- Jamestown Metal Corp., Jamestown, N. Y.
- Kawneer Co., Niles, Mich.
- Ladon Co., Chicago.
- Lau Blower Co., Dayton, O.
- Ledkote Products Co., Long Island City, N. Y.
- Lees, John, Div. Serrick Corp., Muncie, Ind.
- Martin-Parry Corp., York, Pa.
- Maysteel Products, Inc., Mayville, Wis.
- Miller & Doing, Brooklyn, N. Y.
- Pyramid Metals Co., Chicago.
- Revere Copper & Brass, Inc., New York City.
- United Metal Prod. Div., Canton, O.
- United States Stoneware Co., Akron, O., and New York City.
- Werner Co., Inc., R. D., New York City. (Plastic)

MOULDINGS, METAL, FOR SUBSTITUTE DUCTS

Sheetlock Co., Chicago.

NAILS, ALUMINUM

- Aluminum Co. of America, Pittsburgh.
- Hassall, Inc., John, Brooklyn.

NAILS, COPPER

- American Steel & Wire Co., Cleveland.
- Angell Nail & Chaplet Co., Cleveland.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Clendenin Brothers, Inc., Baltimore.
- Columbia Steel Co., San Francisco.
- Conklin Brass & Copper Co., Inc., T. E., New York City.
- Copperweld Steel Co., Glassport, Pa.
- Downs-Smith Brass & Copper Co., New York City.
- Hassall, Inc., John, Brooklyn.
- Hussey & Co., C. G., Pittsburgh.
- Maze Co., W. H., Peru, Ill.
- Turner & Seymour Mfg. Co., Torrington, Conn.

NAILS, HARDENED MASONRY

- American Steel & Wire Co., Cleveland.
- Hillwood Manufacturing Co., Cleveland. (Concrete Pinsors)
- Parker-Kalon Corp., New York City.
- Rawlplug Co., Inc., New York City.
- Tremont Nail Co., Wareham, Mass.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Wheeling Steel Corp., Wheeling, W. Va.

NAILS, ROOFING

- American Steel & Wire Co., Cleveland.
- Angell Nail & Chaplet Co., Cleveland.
- Berger Mfg. Div. of Republic Steel Corp., Canton, O.
- Bethlehem Steel Co., Bethlehem, Pa.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Columbia Steel Co., San Francisco, Calif.
- Conklin Brass & Copper Co., Inc., T. E., New York City. (Copper)
- Continental Steel Corp., Kokomo, Ind.
- Deniston Co., Chicago.
- Dickson Weatherproof Nail Co., Evanston, Ill. (Lead headed).
- Downs-Smith Brass & Copper Co., New York City.
- Edwards Mfg. Co., Inc., Cincinnati.
- Globe Iron Roofing & Corrugating Co., Newport, Ky.
- Hassall, Inc., John, Brooklyn.
- Hussey & Co., C. G., Pittsburgh.
- Jones & Laughlin Steel Corp., Pittsburgh.
- Malleable Iron Fittings Co., Branford, Conn.
- Maze Co., W. H., Peru, Ill.
- Milcor Steel Co., Milwaukee.
- New Delphos Manufacturing Co., Delphos, O.
- Republic Steel Corp., Cleveland.
- Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
- Turner & Seymour Mfg. Co., Torrington, Conn.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Wheeling Steel Corp., Wheeling, W. Va.
- Youngstown Sheet & Tube Co., Youngstown, O.

NAILS, SCREW, HARDENED

- American Steel & Wire Co., Cleveland.
- Dickson Weatherproof Nail Co., Evanston, Ill.
- Hillwood Manufacturing Co., Cleveland. (Drive)
- Jones & Laughlin Steel Corp., Pittsburgh.

• Advertisement in this issue. See Index to Advertisers, page 324.

- Maze Co., W. H., Peru, Ill.
- Parker-Kalon Corp., New York City.
- Republic Steel Corp., Cleveland.

NAILS, STAINLESS STEEL

- American Steel & Wire Co., Cleveland.
- Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
- Hassall, Inc., John, Brooklyn.
- Republic Steel Corp., Cleveland, O.
- Tremont Nail Co., Wareham, Mass.
- Turner & Seymour Mfg. Co., Torrington, Conn.

NAILS, ZINC COATED

- American Steel & Wire Co., Cleveland.
- American Zinc Products Co., Greencastle, Ind.
- Angell Nail & Chaplet Co., Cleveland.
- Berger Mfg. Div. of Republic Steel Corp., Canton, O.
- Bethlehem Steel Co., Bethlehem, Pa.
- Columbia Steel Co., San Francisco.
- Continental Steel Corp., Kokomo, Ind.
- Dickson Weatherproof Nail Co., Evanston, Ill.
- Hassall, Inc., John, Brooklyn.
- Jones & Laughlin Steel Corp., Pittsburgh.
- Malleable Iron Fittings Co., Branford, Conn.
- Maze Co., W. H., Peru, Ill.
- Republic Steel Corp., Cleveland.
- Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
- Tremont Nail Co., Wareham, Mass.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Wheeling Steel Corp., Wheeling, W. Va.
- Youngstown Sheet & Tube Co., Youngstown, O.

NAME PLATES

See Hardware, for Cabinets and Casings

NIBBLERS

See Machines, Nibbling

NIGHT AIR FANS

See Fans, Night Air Cooling

NOZZLES, SPRAY, WATER

- American Cooling Tower Co., Kansas City, Mo.
- April Showers Co., Washington, D. C. (Roof Ceiling)
- Bahnsen Co., Winston-Salem, N. C.
- Balloffett Dies & Nozzle Co., Inc., Guttenberg, N. J.
- Bayley Blower Co., Milwaukee.
- Benjamin Air Rifle Co., St. Louis.
- Binks Mfg. Co., Chicago.
- Blower Application Co., Milwaukee.
- Buffalo Forge Co., Buffalo.
- Chain Belt Co., Milwaukee.
- Clarage Fan Co., Kalamazoo, Mich.
- DeVilbiss Co., Toledo, O.
- Eclipse Air Brush Co., Inc., Newark, N. J.
- Electric Sprayit Co., Sheboygan, Wis.
- Hubbard Co., Minneapolis.
- International Moistening Co., Providence, R. I.
- Link-Belt Co., Chicago.
- Lonn Mfg. Co., Inc., Chicago.
- Marley Co., Kansas City, Kan.
- Martocello & Co., Jos. A., Philadelphia.
- Milburn Co., Alexander, Baltimore, Md.
- Monarch Mfg. Works, Inc., Philadelphia.
- National Engineering & Manufacturing Co., Kansas City, Mo.
- Phillips Cooling Tower Co., Inc., New York City.
- Parks-Cramer Co., Fitchburg, Mass.
- Plummer Spray Equipment Co., Napoleon, Ohio.
- Rega Mfg. Co., Rochester, N. Y.
- Ross Heater & Mfg. Co., Inc., Buffalo.
- Ruppright, Siegfried, Los Angeles. (Roof Cooling)
- Skinner Irrigation Co., Troy, Ohio.
- Spray Engineering Co., Somerville, Mass.
- Spraying Systems Co., Chicago.
- Strandwitz & Co., Inc., W. J., Camden, N. J.
- Sturtevant Co., B. F., Hyde Park, Boston.
- Supreme Electric Products Corp., Rochester, N. Y.
- Thermal Industries, Indio, Calif.
- Water Cooling Corp., New York City.
- Water Cooling Equipment Corp., St. Louis.
- Yarnall-Waring Co., Philadelphia.

NUTS, SHEET METAL

Tinnerman Products, Inc., Cleveland.

ODOR ADSORBERS

See Adsorbers, Odor

OFFSETS, FURNACE PIPE

See Fittings and Accessories, Furnace Pipe

OIL BURNERS

See Burners, Oil

ORNAMENTS, SHEET METAL

See Mouldings and Trim, Ornamental

OXY-ACETYLENE WELDING EQUIPMENT

See Welding Equipment, Oxy-Acetylene

OZONE APPARATUS

- A & J Co., Chicago.
- Automatic Pump & Softener Corp., Rockford, Ill.
- Chelsea Fan & Blower Co., Inc., Irvington, N. J.
- Coroaire Heater Corp., Cleveland.
- Electroaire Corp., Chicago.
- Montgomery Bros., San Francisco.
- Norwood Filtration Co., The, Florence, Mass.
- Ozone Air Co., Grand Rapids, Mich.
- Sealkote Corp., Chicago.
- Triox Engineering Co., St. Louis.
- United States Ozone Co. of America, Scottsdale, Pa.

PAINT, ALUMINUM

- Acme Refining Co., Cleveland.
- Acme White Lead & Color Works, Detroit.
- Acorn Refining Co., Cleveland.
- Allen Co., Inc., L. B., Chicago.
- Aluminum Co. of America, Pittsburgh.
- American-Marietta Co., Chicago.
- Asphalt Products Co., Inc., Syracuse, N. Y.
- Baer Brothers, New York City.
- Blue Ridge Talc Co., Inc., Henry, Va.
- Cabot, Inc., Samuel, Boston.
- Calbar Paint & Varnish Co., Philadelphia.
- Carter Paint Co., Liberty, Ind.
- Connors Paint Mfg. Co., Wm., Troy, N. Y.
- Continental Products Co., Euclid, O.
- Detroit Graphite Co., Detroit.
- Devos & Reynolds Co., Inc., New York City.
- Dragert Co., Inc., C. H., Brooklyn.
- du Pont de Nemours & Co., E. I., Wilmington, Del.
- Flood Company, Cleveland.
- Gerard Chemical Co., Elizabeth, N. J.
- Glidden Co., Cleveland.
- Goodrich Co., B. F., Akron, O.
- Hague & Co., Inc., Alfred, Brooklyn.
- Heath & Milligan Mfg. Co. Div. of Glidden Co., Chicago
- Hilo Varnish Corp., Brooklyn.
- Horn Co., A. C., Long Island City, N. Y.
- Inter-Coastal Paint Co., East St. Louis, Ill.
- Iowa Paint Mfg. Co., Des Moines, Ia.
- Koppers Co., Inc., Pittsburgh.
- Krehbiel Co., J. H., Chicago.
- Lucas & Co., Inc., John, Philadelphia.
- Maas & Waldstein Co., Newark, N. J.
- Midland Paint & Varnish Co., Cleveland.
- National Mfg. Corp., Tonawanda, N. Y.
- Nebel Manufacturing Co., Cleveland.
- Nelson Mfg. Co., N. F., Minneapolis.
- O'Brien Varnish Co., South Bend, Ind.
- Pittsburgh Plate Glass Co., Pittsburgh.
- Presstite Engineering Co., St. Louis.
- Pyrolite Products Co., Cleveland.
- Quigley Co., Inc., New York City.
- Roxall Flexible Finishes, Inc., Elizabeth, N. J.
- Sherwin-Williams Co., Cleveland.
- Sipe & Co., James B., Pittsburgh.
- Socony Paint Products Div., Socony Oil Co., Inc., New York City.
- Thompson & Co., Oakmont (Pittsburgh Dist.), Pa.
- Tropical Paint & Oil Co., Cleveland.
- Truscon Laboratories, Detroit.
- Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
- Wilbur & Williams Co., Boston, Mass.

PAINT, CONCRETE, WATERPROOFING

- Acme Refining Co., Cleveland.
- Acme White Lead & Color Works, Detroit.
- Acorn Refining Co., Cleveland.
- American-Marietta Co., Chicago.
- Asphalt Products Co., Inc., Syracuse, N. Y.
- Babbitt-Barber Asphalt Products, Inc., Madison, Ill.
- Baer Brothers, New York City.
- Barrett Div., Allied Chemical & Die Corp., New York City
- Blue Ridge Talc Co., Inc., Henry, Va.
- Cabot, Inc., Samuel, Boston, Mass.
- Calbar Paint & Varnish Co., Philadelphia.
- Cheesman-Elliott Co., Inc., Brooklyn.
- Coddington Manufacturing Co., E. D., Milwaukee.
- Connors Paint Mfg. Co., Wm., Troy, N. Y.
- Continental Products Co., Euclid, O.
- Devos & Reynolds Co., Inc., New York City.
- du Pont de Nemours & Co., E. I., Wilmington, Del.
- Eastern States Supply Co., Brooklyn.
- Flintkote Co., New York City.
- Gerard Chemical Co., Elizabeth, N. J.
- Glidden Co., Cleveland.
- Hague & Co., Inc., Alfred, Brooklyn.
- Heath & Milligan Mfg. Co., Div. of Glidden Co., Chicago.
- Hilo Varnish Corp., Brooklyn.
- Horn Co., A. C., Long Island City, N. Y.
- Iowa Paint Mfg. Co., Des Moines, Ia.
- Koppers Co., Inc., Pittsburgh.
- Lastik Products Co., Inc., Pittsburgh.
- Lehon Co., Chicago.
- Lucas & Co., Inc., John, Philadelphia.
- Metropolitan Refining Co., Long Island City, N. Y.

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Midland Paint & Varnish Co., Cleveland.
 Nebel Manufacturing Co., Cleveland.
 O'Brien Varnish Co., South Bend, Ind.
 Ohmiac Paint & Refining Co., Chicago.
 Paint-Point Corp., Newark, N. J.
 Pecora Paint Co., Philadelphia.
 Pittsburgh Plate Glass Co., Pittsburgh.
 Protective Coatings, Inc., Detroit.
 Pyrolite Products Co., Cleveland.
 Reilly Tar & Chemical Corp., Indianapolis.
 Saverite Engineering Co., Hoboken, N. J.
 Self-Vulcanizing Rubber Co., Inc., Chicago.
 Sherwin-Williams Co., Cleveland.
 Sonneborn Sons, Inc., L., New York City.
 Southport Paint Co., Savannah, Ga.
 Tamms Silica Co., Chicago.
 Thompson & Co., Oakmont (Pittsburgh Dist.), Pa.
 Toch Brothers, Inc., Elm Park, Staten Island, N. Y.
 Tropical Paint & Oil Co., Cleveland.
 Truscon Laboratories, Detroit.
 United Chromium, Inc., New York City.
 U. S. Gutta Percha Paint Co., Providence, R. I.
 United States Gypsum Co., Chicago.
 United States Stoneware Co., Akron, O., and New York City.
 Walles Dove-Hermiston Corp., Westfield, N. J.
 Wilbur & Williams Co., Boston.
 Wilhelm Co., A., Reading, Pa.

PAINT, COPPER

Acme White Lead & Color Works, Detroit.
 Baer Brothers, New York City.
 Debevoise Co., Brooklyn.
 Devoe & Reynolds Co., Inc., New York City.
 Glidden Company, Cleveland.
 Lucas & Co., Inc., John, Philadelphia.
 Pittsburgh Plate Glass Co., Pittsburgh.
 Sherwin-Williams Co., Cleveland.
 Sipe & Co., James B., Pittsburgh.
 Stokes, Jr., J. W., Brooklyn.
 U. S. Gutta Percha Paint Co., Providence, R. I.

PAINT, CRACKLE FINISH

Acme White Lead & Color Works, Detroit.
 Baer Brothers, New York City.
 Hague & Co., Inc., Alfred, Brooklyn.
 Heath & Milligan Mfg. Co., Div. of Glidden Co., Chicago.
 Hilo Varnish Corp., Brooklyn.
 Inter-Coastal Paint Co., East St. Louis, Ill.
 Iowa Paint Mfg. Co., Des Moines, Ia.
 Lucas & Co., Inc., John, Philadelphia.
 Maas & Waldstein Co., Newark, N. J.
 Patterson-Sargent Co., Cleveland.
 Pittsburgh Plate Glass Co., Pittsburgh.
 Roxallin Flexible Finishes, Inc., Elizabeth, N. J.
 Sanvin Chemical Products Co., Moline, Ill.
 Sherwin-Williams Co., Cleveland.
 Wattenamel Co., Summit, Ill.
 Zapon Div., Atlas Powder Co., North Chicago, Ill.

PAINT, HOT SURFACES

Acme Refining Co., Cleveland.
 Acme White Lead & Color Works, Detroit.
 Acorn Refining Co., Cleveland.
 Allen Co., Inc., L. B., Chicago.
 American Chemical Paint Co., Ambler, Pa.
 American-Marietta Co., Chicago.
 Baer Brothers, New York City.
 Barrett Div., Allied Chemical & Dye Corp., New York City.
 Cabot, Inc., Samuel, Boston.
 Calbar Paint & Varnish Co., Philadelphia.
 Carey Co., Philip, Lockland, O.
 Carter Paint Co., Liberty, Ind.
 Cheesman-Elliott Co., Inc., Brooklyn.
 Continental Products Co., Euclid, O.
 Dampney Co. of America, Hyde Park, Boston.
 Devoe & Reynolds Co., Inc., New York City.
 du Pont de Nemours & Co., E. I., Wilmington, Del.
 Gerard Chemical Co., Elizabeth, N. J.
 Glidden Co., Cleveland.
 Hague & Co., Inc., Alfred, Brooklyn.
 Heath & Milligan Mfg. Co., Div. of Glidden Co., Chicago.
 Hetzel Roofing Products Co., Newark, N. J.
 Hilo Varnish Corp., Brooklyn.
 Horn Co., A. C., Long Island City, N. Y.
 Iowa Paint Mfg. Co., Des Moines, Ia.
 Koppers Co., Inc., Pittsburgh.
 Krehbiel Co., J. H., Chicago.
 Laclede-Christy Clay Products Co., St. Louis.
 Lastik Products Co., Inc., Pittsburgh.
 Lucas & Co., Inc., John, Philadelphia.
 Metropolitan Refining Co., Long Island City, N. Y.
 Midland Paint & Varnish Co., Cleveland.
 National Engineering Products, Inc., Washington, D. C.
 National Mfg. Corp., Tonawanda, N. Y.
 Nebel Manufacturing Co., Cleveland.
 Nelson Mfg. Co., B. F., Minneapolis.
 O'Brien Varnish Co., South Bend, Ind.
 Ohmiac Paint & Refining Co., Chicago.
 Patterson-Sargent Co., Cleveland.
 Pittsburgh Plate Glass Co., Pittsburgh.

Protective Coatings, Inc., Detroit.
 Pyrolite Products Co., Cleveland.
 Quigley Co., Inc., New York City.
 Roxallin Flexible Finishes, Inc., Elizabeth, N. J.
 Sauerelsen Cements Co., Sharpsburg, Pa.
 Sherwin-Williams Co., Cleveland.
 Sipe & Co., James B., Pittsburgh.
 Socony Paint Products Div., Socony-Vacuum Oil Co., Inc., New York City.
 Thompson & Co., Oakmont (Pittsburgh Dist.), Pa.
 Tropical Paint & Oil Co., Cleveland.
 Truscon Laboratories, Detroit.
 U. S. Gutta Percha Paint Co., Providence, R. I.
 Walles Dove-Hermiston Corp., Westfield, N. J.
 Westinghouse Electric & Mfg. Co., East Pittsburgh.
 Wilbur & Williams Co., Boston.

PAINT, METAL PROTECTING, FINISH COAT, BRUSH APPLIED

Acme White Lead & Color Works, Detroit.
 Acorn Refining Co., Cleveland.
 American-Marietta Co., Chicago.
 Barrett Div., Allied Chemical & Dye Corp., New York City.
 Blue Ridge Talc Co., Inc., Henry, Va.
 Cheesman-Elliott Co., Inc., Brooklyn.
 Continental Products Co., Euclid, O.
 Cordo Chemical Corp., Norwalk, Conn.
 Debevoise Co., Brooklyn.
 Detroit Graphite Co., Detroit.
 Devoe & Reynolds Co., Inc., New York City.
 du Pont de Nemours & Co., E. I., Wilmington, Del.
 Glidden Co., Cleveland.
 Heath & Milligan Mfg. Co., Chicago.
 Horn Co., A. C., Long Island City, N. Y.
 Inter-Coastal Paint Corp., East St. Louis, Ill.
 Koppers Co., Inc., Pittsburgh.
 Lucas & Co., Inc., John, Philadelphia.
 Marley Chemical Co., Detroit.
 Midland Paint & Varnish Co., Cleveland. (Red)
 National Lead Co., New York City.
 Nebel Manufacturing Co., Cleveland.
 Nelson Mfg. Co., B. F., Minneapolis.
 North American Fibre Products Co., Cleveland.
 O'Brien Varnish Co., South Bend, Ind.
 Ohmiac Paint & Refining Co., Chicago.
 Patterson-Sargent Co., Cleveland.
 Pittsburgh Plate Glass Co., Pittsburgh.
 Protective Coatings, Inc., Detroit.
 Quigley Co., Inc., New York City.
 Reilly Tar & Chemical Corp., Indianapolis.
 Sanvin Chemical Products Co., Moline, Ill.
 Sherwin-Williams Co., Cleveland.
 Socony Paint Products Div., Socony-Vacuum Oil Co., Inc., New York City.
 Sonneborn Sons, Inc., L., New York City.
 Southport Paint Co., Savannah, Ga.
 Toch Brothers, Inc., Elm Park, S. I., N. Y.
 Tamms Silica Co., Chicago.
 Tropical Paint & Oil Co., Cleveland.
 Truscon Laboratories, Inc., Detroit.
 United Chromium, Inc., New York City.
 U. S. Gutta Percha Paint Co., Providence, R. I.
 U. S. Stoneware Co., Akron, O., and New York City.
 Wilbur & Williams Co., Boston.

PAINT, METAL PROTECTING, FINISH COAT, SPRAY APPLIED

Acme White Lead & Color Works, Detroit.
 American-Marietta Co., Chicago.
 Barrett Div., Allied Chemical & Dye Corp., New York City.
 Carter Paint Co., Liberty, Ind.
 Blue Ridge Talc Co., Inc., Henry, Va.
 Cheesman-Elliott Co., Inc., Brooklyn.
 Continental Products Co., Euclid, O.
 Cordo Chemical Corp., Norwalk, Conn.
 Debevoise Co., Brooklyn.
 Detroit Graphite Co., Detroit.
 Devoe & Reynolds Co., Inc., New York City.
 du Pont de Nemours & Co., E. I., Wilmington, Del.
 Glidden Co., Cleveland.
 Heath & Milligan Mfg. Co., Chicago.
 Inter-Coastal Paint Corp., East St. Louis, Ill.
 Koppers Co., Inc., Pittsburgh.
 Lucas & Co., Inc., John, Philadelphia.
 Marley Chemical Co., Detroit.
 Midland Paint & Varnish Co., Cleveland. (Graphite)
 National Lead Co., New York City.
 Nelson Mfg. Co., B. F., Minneapolis.
 O'Brien Varnish Co., South Bend, Ind.
 Ohmiac Paint & Refining Co., Chicago.
 Patterson-Sargent Co., Cleveland.
 Pittsburgh Plate Glass Co., Pittsburgh.
 Protective Coatings, Inc., Detroit.
 Quigley Co., Inc., New York City.
 Reilly Tar & Chemical Corp., Indianapolis.
 Sanvin Chemical Products Co., Moline, Ill.
 Sherwin-Williams Co., Cleveland.
 Sipe & Co., James B., Pittsburgh.

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Socony Paint Products Div., Socony-Vacuum Oil Co., Inc., New York City.
 Sonneborn Sons, Inc., L., New York City.
 Southport Paint Co., Savannah, Ga.
 Tamms Silica Co., Chicago.
 Tropical Paint & Oil Co., Cleveland.
 Truscon Laboratories, Detroit.
 United Chromium, Inc., New York City.
 U. S. Gutta Percha Paint Co., Providence, R. I.
 U. S. Stoneware Co., Akron, O., and New York City.
 Walles Dove-Hermiston Corp., Westfield, N. J.
 Wilbur & Williams Co., Boston.
 Zapon Div., Atlas Powder Co., North Chicago, Ill.

PAINT, METAL PROTECTING, PRIME COAT, BRUSH APPLIED

Acme White Lead & Color Works, Detroit.
 Acorn Refining Co., Cleveland.
 American Chemical Paint Co., Ambler, Pa.
 American-Marietta Co., Chicago.
 Babbitt-Barber Asphalt Products, Inc., Madison, Ill.
 Barrett Div., Allied Chemical & Die Corp., New York City.
 Blue Ridge Talc Co., Inc., Henry, Va.
 Carey Mfg. Co., Philip, Lockland, O.
 Carter Paint Co., Liberty, Ind.
 Cheesman-Elliott Co., Inc., Brooklyn.
 Continental Products Co., Euclid, O.
 Cordo Chemical Corp., Norwalk, Conn.
 Debevoise Company, Brooklyn.
 Detroit Graphite Co., Detroit.
 Devos & Reynolds Co., Inc., New York City.
 du Pont de Nemours & Co., E. I., Wilmington, Del.
 Flood Co., Cleveland.
 Glidden Co., Cleveland.
 Heath & Milligan Mfg. Co., Chicago.
 Horn Co., A. C., Long Island City, N. Y.
 Inter-Coastal Paint Corp., East St. Louis, Ill.
 Irvington Varnish & Insulator Co., Irvington, N. J.
 Kopperr Co., Inc., Pittsburgh.
 Lucas & Co., Inc., John, Philadelphia.
 Marley Chemical Co., Detroit.
 Midland Paint & Varnish Co., Cleveland.
 National Engineering Products, Inc., Washington, D. C.
 National Lead Co., New York City.
 Nebel Manufacturing Co., Cleveland.
 Nelson Mfg. Co., B. F., Minneapolis.
 O'Brien Varnish Co., South Bend, Ind.
 Ohmiac Paint & Refining Co., Chicago.
 Patterson-Sargent Co., Cleveland.
 Pittsburgh Plate Glass Co., Pittsburgh.
 Protective Coatings, Inc., Detroit.
 Quigley Co., Inc., New York City.
 Reilly Tar & Chemical Corp., Indianapolis.
 Sherwin-Williams Co., Cleveland.
 Sipe & Co., James B., Pittsburgh.
 Socony Paint Products Div., Socony-Vacuum Oil Co., Inc., New York City.
 Sonneborn Sons, Inc., L., New York City.
 Southport Paint Co., Savannah, Ga.
 Tamms Silica Co., Chicago.
 Tropical Paint & Oil Co., Cleveland.
 Truscon Laboratories, Detroit.
 Turco Products, Inc., Los Angeles.
 United Chromium, Inc., New York City.
 U. S. Gutta Percha Paint Co., Providence, R. I.
 U. S. Stoneware Co., Akron, O., and New York City.
 Wilbur & Williams Co., Boston.

PAINT, METAL PROTECTING, PRIME COAT, SPRAY APPLIED

Acme White Lead & Color Works, Detroit.
 American Chemical Paint Co., Ambler, Pa.
 American-Marietta Co., Chicago.
 Babbitt-Barber Asphalt Products, Inc., Madison, Ill.
 Barrett Div., Allied Chemical & Die Corp., New York City.
 Blue Ridge Talc Co., Inc., Henry, Va.
 Carey Mfg. Co., Philip, Lockland, O.
 Carter Paint Co., Liberty, Ind.
 Cheesman-Elliott Co., Inc., Brooklyn.
 Continental Products Co., Euclid, O.
 Cordo Chemical Corp., Norwalk, Conn.
 Debevoise Co., Brooklyn, N. Y.
 Detroit Graphite Co., Detroit.
 Devos & Reynolds Co., Inc., New York City.
 du Pont de Nemours & Co., E. I., Wilmington, Del.
 Flood Co., Cleveland.
 Glidden Co., Cleveland.
 Heath & Milligan Mfg. Co., Chicago.
 Hilo Varnish Corp., Brooklyn. (Zinc Chromate)
 Inter-Coastal Paint Corporation, East St. Louis, Ill.
 Irvington Varnish & Insulator Co., Irvington, N. J.
 Koppers Co., Inc., Pittsburgh, Pa.
 Lucas & Co., Inc., John, Philadelphia.
 Marley Chemical Co., Detroit.
 National Engineering Products, Inc., Washington, D. C.
 National Lead Co., New York City.
 Nelson Mfg. Co., B. F., Minneapolis. (Asphalt Base)
 New Jersey Zinc Co., New York City.
 O'Brien Varnish Co., South Bend, Ind.

Ohmiac Paint & Refining Co., Chicago.
 Patterson-Sargent Co., Cleveland, O.
 Pittsburgh Plate Glass Co., Pittsburgh.
 Protective Coatings, Inc., Detroit.
 Quigley Co., Inc., New York City.
 Reilly Tar & Chemical Corp., Indianapolis.
 Sherwin-Williams Co., Cleveland.
 Sipe & Co., James B., Pittsburgh.
 Socony Paint Products Div., Socony Vacuum Oil Co., Inc., New York City.
 Sonneborn Sons, Inc., L., New York City.
 Southport Paint Co., Savannah, Ga.
 Tamms Silica Co., Chicago.
 Tropical Paint & Oil Co., Cleveland.
 Truscon Laboratories, Detroit.
 United Chromium, Inc., New York City.
 U. S. Gutta Percha Paint Co., Providence, R. I.
 U. S. Stoneware Co., Akron, O., and New York City.
 Wilbur & Williams Co., Boston.
 Zapon Div., Atlas Powder Co., North Chicago, Ill.

PAINT, ROOFING

Acme Refining Co., Cleveland.
 Acme White Lead & Color Works, Detroit.
 Acorn Refining Co., Cleveland.
 American-Marietta Co., Chicago.
 Asphalt Products Co., Inc., Syracuse, N. Y.
 Babbitt-Barber Asphalt Products, Inc., Madison, Ill.
 Baer Brothers, New York City.
 Barrett Div., Allied Chemical & Die Corp., New York City.
 (Pitch)
 Blue Ridge Talc Co., Inc., Henry, Va.
 Cabot, Inc., Samuel, Boston.
 Calbar Paint & Varnish Co., Philadelphia.
 Carey Co., Philip, Lockland, O.
 Carter Paint Co., Liberty, Ind.
 Cheesman-Elliott Co., Inc., Brooklyn.
 Clinton Metallic Paint Co., Clinton, N. Y. (Red Metallic and Venetian)
 Connors Paint Mfg. Co., Wm., Troy, N. Y.
 Continental Products Co., Euclid, O. (All Kinds)
 Debevoise Co., Brooklyn.
 Devos & Reynolds Co., Inc., New York City.
 du Pont de Nemours & Co., E. I., Wilmington, Del.
 Eastern States Supply Co., Brooklyn, N. Y.
 Evercrete Corp., New York City.
 Flintkote Co., New York City.
 Ford Roofing Products Co., Chicago.
 Glidden Co., Cleveland.
 Hague & Co., Inc., Alfred, Brooklyn.
 Heath & Milligan Mfg. Co., Div. of Glidden Co., Chicago.
 Hetzel Roofing Products Co., Newark, N. J.
 Horn Co., A. C., Long Island City, N. Y.
 Inter-Coastal Paint Co., East St. Louis, Ill.
 Iowa Paint Mfg. Co., Des Moines, Ia. (Asphalt)
 Koppers Co., Pittsburgh. (Bituminous)
 Krehbiel Co., J. H., Chicago.
 Lastik Products Co., Inc., Pittsburgh. (Asphalt, Fibre)
 Lehon Co., Chicago.
 Lucas & Co., Inc., John, Philadelphia.
 Lyon, Conklin & Co., Inc., Baltimore.
 Metropolitan Refining Co., Long Island City, N. Y.
 Midland Paint & Varnish Co., Cleveland. (Fibercote)
 Mortell Co., J. W., Kankakee, Ill.
 National Mfg. Corp., Tonawanda, N. Y.
 Nebel Manufacturing Co., Cleveland.
 Nelson Mfg. Co., B. F., Minneapolis.
 North American Fibre Products Co., Cleveland.
 Ohmiac Paint & Refining Co., Chicago, Ill. (Asphalt)
 Pittsburgh Plate Glass Co., Pittsburgh.
 Protective Coatings, Inc., Detroit. (Non-oxidizing)
 Pyrolite Products Co., Cleveland.
 Quigley Co., Inc., New York City.
 Reilly Tar & Chemical Corp., Indianapolis.
 Robertson Co., H. H., Pittsburgh. (Processed Asphalt)
 Ruberoid Co., New York City.
 Rutland Fire Clay Co., Rutland, Vt. (Asphalt)
 Sherwin-Williams Co., Cleveland.
 Sipe & Co., James B., Pittsburgh.
 Sonneborn Sons, Inc., L., New York City.
 Southport Paint Co., Savannah, Ga.
 Tamms Silica Co., Chicago.
 Thompson & Co., Oakmont (Pittsburgh Dist.), Pa.
 Toch Brothers, Inc., Elm Park, S. I., N. Y.
 Tropical Paint & Oil Co., Cleveland.
 Truscon Laboratories, Detroit.
 U. S. Gutta Percha Paint Co., Providence, R. I.
 United States Gypsum Co., Chicago.

PAINT SPRAY GUNS

See Guns, Spray, Paint

PAPER, ASBESTOS

Acme Asbestos Covering & Flooring Co., Chicago.
 Carey Co., Philip, Lockland, O.
 Ehret Magnesia Mfg. Co., Valley Forge, Pa.
 Johns-Manville, New York City.
 Keasbey & Mattison Co., Ambler, Pa.
 Linear Packing & Rubber Co., Inc., Tacony, Philadelphia.
 Norristown Magnesia & Asbestos Co., Norristown, Pa.

• Advertisement in this issue. See Index to Advertisers, page 324.

- Ruberoid Co., New York City.
- Sall Mountain Co., Chicago.
- Smith & Kanzler Corp., Elizabeth, N. J.
- Standard Asbestos Mfg. Co., Chicago.
- Wilson, Inc., Grant, Chicago.

PARTS, for HEATING and AIR CONDITIONING EQUIPMENT

(Tank Heads and Bottoms, Water Heater Legs)

- Ackermann Mfg. Co., Wheeling, W. Va. (Furnace Heads).
- Anemostat Corporation of America, New York City.
- Commercial Shearing & Stamping Co., Youngstown, O.
- Detroit Stamping Co., Detroit.
- Lindsay & Lindsay, Chicago.

PASTE, ASBESTOS PAPER

- Acme Asbestos Covering & Flooring Co., Chicago.
- Clark Stek-O Corp., Rochester, N. Y.
- Lyon, Conklin & Co., Inc., Baltimore.
- Norristown Magnesia & Asbestos Co., Norristown, Pa.
- Rutland Fire Clay Co., Rutland, Vt.
- Sall Mountain Co., Chicago.
- Smith & Kanzler Corp., Elizabeth, N. J.
- Standard Asbestos Mfg. Co., Chicago.
- Western Mineral Products Co., Omaha, Nebr.
- Williamson Heater Co., Cincinnati.
- Wilson, Inc., Grant, Chicago.

PATTERNS, BLUE PRINT, ELBOWS, SKYLIGHTS and FITTINGS

- Gray, G. L., New Haven, Conn.

PERFORATED METAL

See Metals, Perforated, Sheet and Plate

PILLOW BLOCKS

See Bearings, Pillow Block

PIPE, CONDUCTOR

- Ames Co., W. R., San Francisco.
- Barnes Metal Products Co., Chicago.
- Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.
- Berger Bros. Co., Philadelphia.
- Berger Mfg. Div. of Republic Steel Corp., Canton, O.
- Braden Mfg. Co., Terre Haute, Ind.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Chicago Metal Mfg. Co., Chicago.
- Cincinnati Sheet Metal & Roofing Co., Cincinnati.
- Downs-Smith Brass & Copper Co., New York City.
- Edwards Manufacturing Co., Inc., Cincinnati.
- Globe Iron Roofing & Corrugating Co., Newport, Ky.
- Herbert & Sons, T. L., Nashville, Tenn.
- Hussey & Co., C. G., Pittsburgh. (Copper)
- Klauser Manufacturing Co., Dubuque, Ia.
- Krauser-Boyd, Inc., North Tonawanda, N. Y.
- La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
- Lamb & Ritchie Co., Cambridge, Mass.
- Lyon, Conklin & Co., Inc., Baltimore.
- Milcor Steel Co., Milwaukee.
- Miller & Doing, Brooklyn.
- New Delphos Manufacturing Co., Delphos, O.
- Osborn Co., J. M. & L. A., Cleveland.
- Reeves Steel & Mfg. Co., Dover, O.
- Riggin Metal Products, Inc., Kankakee, Ill.
- St. Paul Corrugating Co., St. Paul, Minn.
- Schechter Brothers Co., Philadelphia.
- Schoedinger, F. O., Columbus, O.
- Sheet Metal Mfg. Co., Inc., Brooklyn.
- Sheet Metal Products Co., Peoria, Ill.
- Tiffin Eaves Trough Clamp Co., Tiffin, O.
- Tri-State Heating Supply Co., Fort Wayne, Ind.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Williams-Wallace Co., San Francisco.
- Woolwine Metal Products Co., Los Angeles.
- York Corrugating Co., York, Pa.

PIPE, FURNACE

- Acer & Whedon, Inc., Medina, N. Y.
- Acme Tin Plate & Roofing Supply Co., Philadelphia.
- Biersach & Niedermeyer Co., Milwaukee.
- Braden Mfg. Co., Terre Haute, Ind.
- Champion Furnace Pipe Co., Peoria, Ill.
- Char-Gale Mfg. Co., Minneapolis.
- Chicago Furnace Supply Co., Chicago.
- Cincinnati Sheet Metal & Roofing Co., Cincinnati.
- Cincinnati Stamping Co., Cincinnati.
- Corbman Bros., Inc., Philadelphia.
- Detroit Safety Furnace Pipe Co., Detroit.
- Excelsior Steel Furnace Co., Chicago.
- Excelsior Stove & Mfg. Co., Quincy, Ill.
- Gray Metal Products, Inc., Rochester, N. Y.
- Green Colonial Furnace Co., Des Moines.
- Herbert & Sons, T. L., Nashville, Tenn.
- Home Furnace Co., Holland, Mich.
- Howes-Woods Co., Cambridge, Mass.
- International Heater Co., Utica, N. Y.
- Juniper Elbow Co., Inc., Middle Village, L. I., N. Y.
- Keith Furnace Co., Des Moines, Ia.

- La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
- Lamneck Products, Inc., Middletown, O.
- Lennox Furnace Co., Marshalltown, Ia.
- Lyon, Conklin & Co., Inc., Baltimore.

- Majestic Co., Huntington, Ind.
- Made-Rite Furnace Pipe & Fittings Co., Newport, Ky.
- Maple City Furnace Co., Monmouth, Ill.
- Metaloid Co., Cleveland.
- Meyer & Bro. Co., F., Peoria, Ill.
- Milcor Steel Co., Milwaukee.
- Mueller Furnace Co., L. J., Milwaukee.
- Olsen Manufacturing Co., C. A., Elyria, O.
- Osborn Co., J. M. & L. A., Cleveland.
- Parkersburg Iron & Steel Co., Parkersburg, W. Va.
- Payne Furnace & Supply Co., Beverly Hills, Calif.
- Peerless Foundry Co., Indianapolis.
- Portland Stove Foundry Co., Portland, Me.
- Reeves Steel & Mfg. Co., Dover, O.
- Riggin Metal Products, Kankakee, Ill.
- Schechter Brothers Co., Philadelphia.
- Schoedinger, F. O., Columbus.
- Sheet Metal Mfg. Co., Inc., Brooklyn.
- Sheet Metal Specialty Co., Pittsburgh.
- Sioux Steel Co., Sioux Falls, S. D.
- Skinner Htg. & Vent. Co., Heater Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis.
- Standard Furnace & Supply Co., Omaha, Nebr.
- Stratton & Terstegge Co., Louisville, Ky.
- Tiffin Eaves Trough Clamp Co., Tiffin, O.
- Tri-State Heating Supply Co., Fort Wayne, Ind.
- United States Register Co., Battle Creek, Mich.
- Waterman-Waterbury Co., Minneapolis.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Williamson Heater Co., Cincinnati.
- Williams-Wallace Co., San Francisco.

PIPE, SMOKE

- Acer & Whedon, Inc., Medina, N. Y.
- Acme Tin Plate & Roofing Supply Co., Philadelphia.
- Bieler & Son, L., Long Island City, N. Y.
- Biersach & Niedermeyer Co., Milwaukee.
- Bovee Furnace Works, Waterloo, Ia. (Cast Iron)
- Braden Mfg. Co., Terre Haute, Ind.
- Campbell Heating Co., Des Moines, Ia.
- Champion Furnace Pipe Co., Peoria, Ill.
- Char-Gale Mfg. Co., Minneapolis.
- Chicago Metal Mfg. Co., Chicago.
- Cincinnati Sheet Metal & Roofing Co., Cincinnati.
- Cincinnati Stamping Co., Cincinnati.
- Corbman Bros., Inc., Philadelphia.
- Detroit Safety Furnace Pipe Co., Detroit.
- Excelsior Steel Furnace Co., Chicago.
- Excelsior Stove & Mfg. Co., Quincy, Ill.
- Galva Heater Co., Galva, Ill. (Cast Iron)
- Green Colonial Furnace Co., Des Moines, Ia.
- Herbert & Sons, T. L., Nashville, Tenn.
- Home Furnace Co., Holland, Mich.
- Howes-Woods Co., Cambridge, Mass.
- International Heater Co., Utica, N. Y.
- Juniper Elbow Co., Inc., Middle Village, L. I., N. Y.
- Keith Furnace Co., Des Moines, Ia.
- Krauser-Boyd, Inc., North Tonawanda, N. Y.
- La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
- Lamneck Products, Inc., Middletown, O.
- Lennox Furnace Co., Marshalltown, Ia.
- Lyon, Conklin & Co., Inc., Baltimore.
- Made-Rite Furnace Pipe & Fittings Co., Newport, Ky.
- Majestic Co., Huntington, Ind.
- Maple City Furnace Co., Monmouth, Ill.
- Marshall Furnace Co., Marshall, Mich.
- Meyer & Bro. Co., F., Peoria, Ill.
- Milcor Steel Co., Milwaukee.
- Mueller Furnace Co., L. J., Milwaukee.
- Olsen Manufacturing Co., C. A., Elyria, Ohio.
- Osborn Co., J. M. & L. A., Cleveland.
- Parkersburg Iron & Steel Co., Parkersburg, W. Va.
- Patten Co., J. V., Sycamore, Ill.
- Peerless Foundry Co., Indianapolis.
- Portland Stove Foundry Co., Portland, Me.
- Puhl & Hepper Mfg. Co., Inc., St. Louis.
- Reeves Steel & Mfg. Co., Dover, O.
- Riggin Metal Products, Kankakee, Ill.
- Schechter Brothers Co., Philadelphia.
- Schoedinger, F. O., Columbus, O.
- Sheet Metal Mfg. Co., Inc., Brooklyn.
- Sioux Steel Co., Sioux Falls, S. D.
- Skinner Htg. & Vent. Co., Heater Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis.
- Standard Furnace & Supply Co., Omaha, Nebr.
- Ster-Na-Man Foundry Co., Springfield, Ill. (Cast Iron)
- Stratton & Terstegge Co., Louisville, Ky.
- Tiffin Eaves Trough Clamp Co., Tiffin, O.
- Tri-State Heating Supply Co., Fort Wayne, Ind.
- United States Register Co., Battle Creek, Mich.
- Waterman-Waterbury Co., Minneapolis.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Wilder Manufacturing Co., Niles, O.
- Williamson Heater Co., Cincinnati.
- Williams-Wallace Co., San Francisco.
- Wise Furnace Co., Akron, O.

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PIPE LOCK FORMERS

See Machines, Pipe, Lock Forming

PIPE & FITTINGS, GAS VENT AND FLUE

- Baltimore Enamel & Novelty Co., Baltimore. (Porcelain Enamel)
Aluminum and Galvanized Iron)
- Char-Gale Mfg. Co., Minneapolis. (Blue and Galvanized)
 - Cincinnati Sheet Metal & Roofing Co., Cincinnati.
 - Condensation Engineering Corp., Chicago. (Vitreous Enamel)
 - Heremetal Co., Minneapolis. (Heresite Coated)
 - Johns-Manville, New York City.
 - Laclede Steel Co., St. Louis. (Butt Weld—Wrought Steel)
 - Osborn Co., J. M. & L. A., Cleveland.
 - Payne Furnace & Supply Co., Beverly Hills, Calif. (Insulated Aluminum and Galv. Iron)
 - Tri-State Heating Supply Co., Fort Wayne, Ind.
 - Wilder Manufacturing Co., Niles, O.
 - Williams-Wallace Co., San Francisco.

PIPE AND FITTINGS, SHEET METAL

See Ducts and Fittings, Prefabricated

PITTSBURGH LOCK FORMING MACHINES

See Machines, Pittsburgh Lock Forming

PLATES, ALLOY

- Allegheny Ludlum Steel Corp., Brackenridge, Pa. (Stainless)
Aluminum Co. of America, Pittsburgh.
- American Brass Co., Waterbury, Conn. (Copper)
 - American Rolling Mill Co., Middletown, O.
 - Bethlehem Steel Co., Bethlehem, Pa.
 - Bridgeport Brass Co., Bridgeport, Conn.
 - Carnegie-Illinois Steel Corp., Pittsburgh.
 - Chase Brass & Copper Co., Inc., Waterbury, Conn. (Copper and its alloys)
 - Colonial Alloys Co., Philadelphia. (Stainless)
 - Dow Chemical Co., Midland, Mich.
 - Great Lakes Steel Corporation, Ecorse, Detroit.
 - Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago. (Stainless Clad)
 - International Nickel Co., Inc., New York City. (Monel, Nickel, Inconel)
 - Jessop Steel Co., Washington, Pa. (Air Craft)
 - Lukens Steel Co., Coatesville, Pa.
 - Republic Steel Corp., Cleveland.
 - Revere Copper & Brass, Inc., New York City.
 - Universal-Cyclops Steel Corporation, Bridgeville, Pa.
 - Youngstown Sheet & Tube Co., Youngstown, O.

PLATES, STEEL

- American Rolling Mill Co., Middletown, O.
- Bethlehem Steel Co., Bethlehem, Pa.
- Carnegie-Illinois Steel Corp., Pittsburgh.
- Columbia Steel Co., San Francisco.
- Granite City Steel Co., Granite City, Ill.
- Great Lakes Steel Corp., Ecorse, Detroit.
- Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago. (Stainless Clad)
- Inland Steel Co., Chicago.
- International Steel Co., Evansville, Ind.
- Jessop Steel Co., Washington, Pa.
- Jones & Laughlin Steel Corp., Pittsburgh.
- Lukens Steel Co., Coatesville, Pa.
- Republic Steel Corp., Cleveland.
- Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
- Weirton Steel Co., Weirton, W. Va.
- Wood Steel Co., Alan, Conshohocken, Pa.
- Youngstown Sheet & Tube Co., Youngstown, O.

PLATES, WROUGHT IRON

Byers Co., A. M., Pittsburgh.

POLISHERS

See Buffers, Grinders, Polishers, Sanders and Finishers, Metal

PREFABRICATED DUCTS

See Ducts and Fittings, Prefabricated

PRESSES AND DIES

- Bath Co., Cyril, Cleveland.
- Bertsch & Co., Cambridge City, Ind.
- Bliss Co., E. W., Toledo, O.
- C-B Tool Co., Lancaster, Pa. (Dies)
- Callahan Can Machine Co., Inc., Brooklyn.
- Cincinnati Shaper Co., Cincinnati.
- Clearing Machine Corp., Chicago. (Presses)
- Cleveland Punch & Shear Works Co., Cleveland.
- Continental Machines, Inc., Minneapolis.
- Dreis & Krump Mfg. Co., Chicago.
 - Grand Rapids Die & Tool Co., Grand Rapids, Mich.
 - Henry & Wright Mfg. Co., Hartford, Conn.
 - Leslie Welding Co., Chicago. (Hand Punch Press)
 - Marshalltown Mfg. Co., Marshalltown, Ia.
 - Minster Machine Co., Minster, O.
 - New Albany Machine Mfg. Co., New Albany, Ind.
 - Niagara Machine & Tool Works, Buffalo.
 - Peck, Stow & Wilcox Co., Southington, Conn.
 - Perkins Machine Co., Warren, Mass.
 - Service Machine Co., Elizabeth, N. J.
 - Spun Steel Corp., Canton, O.

Swain Mfg. Co., Fred J., St. Louis.

- Vernon Allsteel Press Co., Chicago.
- Wales-Strippit Corp., North Tonawanda, N. Y. (Dies)
- Ward Machinery Co., Chicago.
- Zeh & Hahnemann Co., Newark, N. J.

PROTECTORS, DOWNSPOUT

See Fittings and Accessories, Conductor

PSYCHROMETERS, SLING AND HAND-ASPIRATED

- American Moistening Co., Providence, R. I.
- Friez Instrument Division, Towson, Md.
- G. M. Manufacturing Co., New York City.
- General Scientific Equipment Co., Philadelphia.
- Grinnell Co., Inc., Providence, R. I.
- H-B Instrument Co., Inc., Philadelphia.
- Hill, E. Vernon, Chicago.
- Johnson Service Co., Milwaukee.
- Leeds & Northrup Co., Philadelphia.
- Moeller Instrument Co., Richmond Hill, N. Y.
- Palmer Co., Norwood, Cincinnati.
- Parks-Cramer Co., Fitchburg, Mass.
- Precision Thermometer & Instrument Co., Philadelphia.
- Scientific Instrument Co., Detroit.
- Tagliabue Mfg. Co., C. J., Brooklyn.
- Taylor Instrument Companies, Rochester, N. Y.
- Terlice Co., H. O., Detroit.
- Weksler Thermometer Corp., New York City.

PULLEYS, FAN AND MOTOR

- Allis-Chalmers Mfg. Co., Milwaukee.
- American Pulley Co., Philadelphia.
- Browning Mfg. Co., Inc., Maysville, Ky.
- Central Die Casting & Mfg. Co., Inc., Chicago.
- Chicago Die Casting Co., Chicago.
- Congress Die Casting Div., Congress Tool & Die Co., Detroit.
- Dayton Rubber Mfg. Co., Dayton, O.
- Dick Co., Inc., R. & J., Passaic, N. J.
- Dodge Mfg. Corp., Mishawaka, Ind.
- Duro Metal Products Co., Chicago.
- Gates Rubber Co., Denver, Colo.
- Goldens' Fdry. & Mach. Co., Columbus, Ga. (Cast Iron)
- Horton Mfg. Co., Minneapolis.
- Jones Fdry. & Mach. Co., W. A., Chicago.
- Lau Blower Co., Dayton, O.
 - Linderme Machine & Tool Co., Inc., Detroit.
 - Maurey Mfg. Corp., Chicago.
 - Medart Co., St. Louis.
 - Morrison Products, Inc., Cleveland.
 - Pyott Fdry. & Mach. Co., Chicago.
 - Reynolds Mfg. Co., Grand Rapids, Mich.
 - Rockwood Mfg. Co., Indianapolis.
 - Smith, Inc., Winfield H., Springfield, N. Y.
 - Spun Steel Corp., Canton, O.
 - Swift Mfg. Co., Detroit, Mich.
 - Utility Fan Corporation, Los Angeles. (Appliance)
 - Wood's Sons Co., T. B., Chambersburg, Pa.

PULLEYS, FURNACE CHAIN

- Hart & Cooley Mfg. Co., Holland, Mich.
- Medart Co., St. Louis.
- Mueller Furnace Co., L. J., Milwaukee.
- United States Register Co., Battle Creek, Mich.

PULLEYS, VARIABLE SPEED

- Allis-Chalmers Manufacturing Co., Milwaukee.
- American Pulley Co., Philadelphia.
- Browning Mfg. Co., Inc., Maysville, Ky.
- Chicago Die Casting Co., Chicago.
- Congress Die Casting Div., Congress Tool & Die Co., Detroit.
- Equipment Engineering Co., Minneapolis.
- Gates Rubber Co., Sales Div., Denver, Colo.
- Ideal Commutator Dresser Co., Sycamore, Ill.
- Lau Blower Co., Dayton, O.
 - Lewellen Mfg. Co., Columbus, Ind.
 - Link-Belt Co., Chicago.
 - Mayne Products Co., Dayton, O.
 - Reeves Pulley Co., Columbus, Ind.
 - Scientiae Tool Co., Dayton, O.
 - Speedmaster Co., Des Plaines, Ill.
 - White Manufacturing Co., St. Paul.
 - Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, DEEP-WELL

- American-Marsh Pumps, Inc., Battle Creek, Mich.
- Chandler Co., Cedar Rapids, Ia.
- Cook, Inc., A. D., Lawrenceburg, Ind.
- Crane Co., Chicago.
- Dayton Pump & Mfg. Co., Dayton, O.
- Decatur Pump Co., Decatur, Ill.
- Delco Appliance Div., General Motors Corp., Rochester, N. Y.
- Deming Co., Salem, O.
- Evans Machine Co., L. R., Sandwich, Ill.
 - Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
 - Fairbanks, Morse & Co., Chicago.
 - Goulds Pumps, Inc., Seneca Falls, N. Y.
 - Hell Co., Milwaukee, Wis.
 - Jackson Co., Byron, Los Angeles. (Submersible)
 - Layne & Bowler, Inc., Memphis, Tenn.

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- Monarch Engineering Company, Dayton, O.
 Myers & Bro. Co., F. E., Ashland, O.
 Pacific Pump Works, Huntington Park, Calif.
 Peerless Pump Division, Food Machinery Corporation, Los Angeles (Twinline)
 Peerless Pump Div., Food Machinery Corp., Canton, O.
 Pomona Pumps, Fairbanks, Morse & Co., Pomona, Calif.
 Red Jacket Mfg. Co., Davenport, Ia.
 Uniflow Mfg. Co., Erie, Pa.
 • Wayne Oil Burner Co., Fort Wayne, Ind.
 Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, FUEL OIL (for Oil Burners)

- Automatic Products Company, Milwaukee.
 DeLaval Steam Turbine Co., Trenton, N. J.
 Kraissel Co., Inc., Hackensack, N. J.
 May Oil Burner Corporation, Baltimore.
 Monarch Manufacturing Works, Inc., Philadelphia.
 Quimby Pump Co., Inc., Newark, N. J.
 Roper Corp., Geo. D., Rockford, Ill.
 Tuthill Pump Co., Chicago.
 Viking Pump Company, Cedar Falls, Ia.
 • Wayne Oil Burner Co., Fort Wayne, Ind.
 Webster Electric Co., Racine, Wis.

PUMPS, SHALLOW-WELL

- American-Marsh Pumps, Inc., Battle Creek, Mich.
 Chandler Co., Cedar Rapids, Ia.
 Chicago Pump Co., Chicago.
 Cook, Inc., A. D., Lawrenceburg, Ind.
 Crane Co., Chicago, Ill.
 Dayton Pump & Mfg. Co., Dayton, O.
 Decatur Pump Co., Decatur, Ill.
 DeLaval Steam Turbine Co., Trenton, N. J.
 Delco Appliance Div., General Motors Corp., Rochester, N. Y.
 Deming Co., Salem, O.
 Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
 Fairbanks, Morse & Co., Chicago, Ill.
 • Frederick Iron & Steel Co., Frederick, Md.
 Goulds Pumps, Inc., Seneca Falls, N. Y.
 Hell Co., Milwaukee, Wis.
 Layne & Bowler, Inc., Memphis, Tenn.
 Monarch Engineering Company, Dayton, O.
 Morris Machine Works, Baldwinville, N. Y.
 Myers & Bro. Co., F. E., Ashland, O.
 Pacific Pump Works, Huntington Park, Calif.
 Peerless Pump Division, Food Machinery Corporation, Los Angeles (Jet)
 Peerless Pump Div., Food Machinery Corp., Canton, O.
 Pomona Pumps, Fairbanks, Morse & Co., Pomona, Calif.
 Red Jacket Mfg. Co., Davenport, Ia.
 Robbins & Myers, Inc., Springfield, O.
 Uniflow Mfg. Co., Erie, Pa.
 Union Steam Pump Co., Battle Creek, Mich.
 Viking Pump Co., Cedar Falls, Ia.
 Weinman Pump Mfg. Co., Columbus, O.
 Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, WATER CIRCULATING

- Aldrich Pump Co., Allentown, Pa.
 Aills-Chalmers Mfg. Co., Milwaukee, Wis.
 American-Marsh Pumps, Inc., Battle Creek, Mich.
 Bell & Gossett Company, Morton Grove, Ill.
 Buffalo Pumps, Inc., Buffalo.
 Chicago Pump Co., Chicago.
 Decatur Pump Co., Decatur, Ill.
 Deming Co., Salem, O.
 De Laval Steam Turbine Co., Trenton, N. J.
 Economy Pumps, Inc., Hamilton, O.
 Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
 Fairbanks, Morse & Co., Chicago.
 • Frederick Iron & Steel Co., Frederick, Md.
 Goulds Pumps, Inc., Seneca Falls, N. Y.
 Ingersoll-Rand, New York City.
 Kehm Corporation, Chicago.
 Lecourtenay Co., Newark, N. J.
 Lewis & Co., Inc., Chas. S., St. Louis.
 Monarch Engineering Company, Dayton, O.
 Morris Machine Works, Baldwinville, N. Y.
 Myers & Bro. Co., F. E., Ashland, O.
 Nash Engineering Co., South Norwalk, Conn.
 National Steam Pump Co., Upper Sandusky, O.
 Pacific Pump Works, Huntington Park, Calif.
 Palmer Electric Co., Detroit.
 Peerless Pump Division, Food Machinery Corporation, Los Angeles (Centrifugal)
 Peerless Pump Div., Food Machinery Corp., Canton, O.
 Pernot & Rich, Inc., Los Angeles.
 Pomona Pumps, Fairbanks, Morse & Co., Pomona, Calif.
 Quimby Pump Co., Inc., Newark, N. J.
 Red Jacket Mfg. Co., Davenport, Ia.
 Robbins & Myers, Inc., Springfield, O.
 Roper Corp., Geo. D., Rockford, Ill.
 • Schwitzer-Cummins Co., Indianapolis.
 Spiegel Corporation, G. B., Chicago.
 Swaby Mfg. Co., Chicago.
 Thrush & Co., H. A., Peru, Ind.
 Trane Co., LaCrosse, Wis.
 Trimount Rotary Power Co., East Dedham, Mass.
 Uniflow Mfg. Co., Erie, Pa.

- Union Steam Pump Co., Battle Creek, Mich.
 • Utility Appliance Corporation, Los Angeles.
 Viking Pump Co., Cedar Falls, Ia.
 • Wayne Oil Burner Co., Fort Wayne, Ind.
 Well Pump Co., Chicago.
 Weinman Pump Mfg. Co., Columbus, O.
 Worthington Pump & Machinery Corp., Harrison, N. J.
 Yeomans Bros. Co., Chicago.

PUNCHES AND SHEARS COMBINED, LEVER OPERATED

- Armstrong-Blum Mfg. Co., Chicago.
 Bertsch & Co., Cambridge City, Ind.
 Bollaert, M., Oakland, Calif.
 Buffalo Forge Co., Buffalo.
 Cleveland Punch & Shear Works Co., Cleveland.
 Excelsior Tool & Machine Co., East St. Louis, Ill.
 G.D.S. Machinery & Supply Co., New York City.
 Heartley Machine & Tool Co., Toledo, O.
 Hendley & Whittemore Co., Beloit, Wis.
 Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
 National Machine Tool Co., Racine, Wis.
 • Niagara Machine & Tool Works, Buffalo.
 • Peck, Stow & Wilcox Co., Southington, Conn.
 Roversford Foundry & Machine Co., Roversford, Pa.
 Weiss & Co., H., New York City.

PUNCHES, BENCH

- Armstrong-Blum Mfg. Co., Chicago.
 Bollaert, M., Oakland, Calif.
 Buffalo Forge Co., Buffalo.
 Champion Blower & Forge Co., Lancaster, Pa.
 Clough, A. W., Meriden, Conn.
 Excelsior Tool and Machine Co., East St. Louis, Ill.
 Heartley Machine & Tool Co., Toledo, O.
 Hendley & Whittemore Co., Beloit, Wis.
 Kidder Mfg. Co., J. F., Burlington, Vt.
 Maplewood Machinery Co., Chicago.
 New Albany Machine Mfg. Co., New Albany, Ind.
 • Niagara Machine & Tool Works, Buffalo.
 • Peck, Stow & Wilcox Co., Southington, Conn.
 Weiss & Co., H., New York City.
 • Whitney Mfg. Co., W. A., Rockford, Ill.
 • Whitney Metal Tool Co., Rockford, Ill.
 Wiedemann Machine Co., Philadelphia (Turret).

PUNCHES, COMBINATION HAND AND BENCH

- Armstrong-Blum Mfg. Co., Chicago.
 Bollaert, M., Oakland, Calif.
 Champion Blower & Forge Co., Lancaster, Pa.
 Heartley Machine & Tool Co., Toledo, O.
 Hendley & Whittemore Co., Beloit, Wis.
 • Niagara Machine & Tool Works, Buffalo.
 • Parker-Kalon Corp., New York City.
 • Peck, Stow & Wilcox Co., Southington, Conn.
 Weiss & Co., H., New York City.
 • Whitney Mfg. Co., W. A., Rockford, Ill.
 • Whitney Metal Tool Co., Rockford, Ill.

PUNCHES, HAND

- Armstrong-Blum Mfg. Co., Chicago.
 Bertsch & Co., Cambridge City, Ind.
 Bollaert, M., Oakland, Calif.
 Buffalo Forge Co., Buffalo.
 Champion Blower & Forge Co., Lancaster, Pa.
 Cleveland Punch & Shear Works Co., Cleveland.
 Clough, A. W., Meriden, Conn.
 • Crescent Tool Co., Jamestown, N. Y.
 • Damascus Steel Products Corporation, Rockford, Ill.
 Hendley & Whittemore Co., Beloit, Wis.
 Ingels Elbow Machine Corporation, Chicago.
 Johnson, Inc., William, Newark, N. J.
 Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
 Maplewood Machinery Co., Chicago.
 • Niagara Machine & Tool Works, Buffalo.
 • Parker-Kalon Corp., New York City.
 • Peck, Stow & Wilcox Co., Southington, Conn.
 Penn Tool Co., Philadelphia.
 Service Machine Co., Elizabeth, N. J.
 Stanley Tools, New Britain, Conn.
 Weiss & Co., H., New York City.
 • Whitney Mfg. Co., W. A., Rockford, Ill.
 • Whitney Metal Tool Co., Rockford, Ill.
 Wiedemann Machine Co., Philadelphia (Turret).

PUNCHES, POWER

- Beatty Machine & Mfg. Co., Hammond, Ind.
 Bertsch & Co., Cambridge City, Ind.
 Bliss Co., E. W., Toledo, O.
 Buffalo Forge Co., Buffalo.
 Callahan Can Machine Co., Inc., Brooklyn.
 Cleveland Punch & Shear Works Co., Cleveland.
 Excelsior Tool and Machine Co., East St. Louis, Ill.
 Hendley & Whittemore Co., Beloit, Wis.
 Henry & Wright Mfg. Co., Hartford, Conn.
 New Albany Machine Mfg. Co., New Albany, Ind.
 • Niagara Machine & Tool Works, Buffalo.
 • Peck, Stow & Wilcox Co., Southington, Conn.
 Perkins Machine Co., Warren, Mass.

• Advertisement in this issue. See Index to Advertisers, page 324.

- Royersford Foundry & Machine Co., Royersford, Pa.
 Service Machine Co., Elizabeth, N. J.
 Swaine Mfg. Co., Fred J., St. Louis.
 Thomas Machine Manufacturing Co., Pittsburgh.
 • Verson Allsteel Press Co., Chicago.
 Wales-Strippit Corporation, North Tonawanda, N. Y.
 Weiss & Co., H., New York City.
 • Whitney Metal Tool Co., Rockford, Ill.
 Wiedemann Machine Co., Philadelphia (Turret).
 Zeh & Hahnemann Co., Newark, N. J.

QUADRANTS, DAMPER

See Regulators, Damper Sets

RECORDERS, HUMIDITY, PORTABLE

- Bristol Co., Waterbury, Conn.
 Brown Instrument Co., Div. of Minneapolis-Honeywell Reg. Co., Philadelphia.
 Foxboro Co., Foxboro, Mass.
 Friez Instrument Division, Towson, Md.
 Leeds & Northrup Co., Philadelphia.
 Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
 Marsh Corporation, Jas. P., Chicago.
 • Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
 Scientific Instrument Co., Detroit.
 Tagliabue Mfg. Co., C. J., Brooklyn.
 Taylor Instrument Companies, Rochester, N. Y.
 Trerice Co., H. O., Detroit.

RECORDERS, TEMPERATURE, PORTABLE

- Bailey Meter Company, Cleveland.
 Bristol Co., Waterbury, Conn.
 Brown Instrument Co., Div. of Minneapolis-Honeywell Reg. Co., Philadelphia.
 Defender Instrument & Regulator Co., St. Louis.
 Foxboro Co., Foxboro, Mass.
 Friez Instrument Division, Towson, Md.
 Leeds & Northrup Co., Philadelphia.
 Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
 Marsh Corporation, Jas. P., Chicago.
 Mason-Nellan Regulator Co., Chicago.
 • Minneapolis-Honeywell Regulator Co., Minneapolis.
 Moeller Instrument Co., Richmond Hill, New York City.
 Palmer Co., Norwood, Cincinnati (mercury actuated).
 Practical Instrument Co., Chicago.
 Preferred Utilities Mfg. Corp., New York City.
 Scientific Instrument Co., Detroit.
 Tagliabue Mfg. Co., C. J., Brooklyn.
 Taylor Instrument Companies, Rochester, N. Y.
 Trerice Co., H. O., Detroit.
 Weksler Thermometer Corp., New York City.

REFRACTORIES

- Babcock & Wilcox Co., New York City.
 Bird Archer Co., Philadelphia.
 • Bottfield Refractories Company, Philadelphia.
 Chicago Fire Brick Co., Chicago.
 Commonwealth Products Co., Philadelphia.
 Ehret Magnesia Mfg. Co., Valley Forge, Pa.
 • Fireline Stove & Furnace Lining Co., Chicago. (For Hearths and Firepot Linings)
 General Insulating Products Co., Brooklyn.
 Gilbert & Son, Harry E., Bridgeport, Conn. (Radiant).
 Green Fire Brick Co., A. P., Mexico, Mo.
 Johns-Manville, New York City (Cement and monolithic).
 Krehbiel Co., J. H., Chicago.
 Laclede-Christy Clay Products Co., St. Louis (Fire Clay).
 Ludowici-Celadon Co., Chicago.
 McLeod & Henry Co., Inc., Troy, N. Y. (Silican Carbide).
 Munn and Steele, Inc., Newark, N. J.
 • Peterson Co., B. A., Dowagiac, Mich.
 Pilbrico Jointless Firebrick Co., Chicago (castable and plastic fire brick).
 Preferred Utilities Mfg. Corp., New York City.
 Pyrolite Products Co., Cleveland.
 Quigley Company, Inc., New York City (Firebrick and Cements)
 Ramtite Co., Chicago (Castable).
 Refractory & Insulation Corp., New York City.
 Rex Clay Products Co., Detroit.
 Robinson Insulation Co., Great Falls, Mont.
 Ruberiod Co., New York City.
 Rutland Fire Clay Co., Rutland, Vt. (Retort Cement)
 Standard Fuel Engineering Co., Detroit.
 Taylor Sons Co., Charles, Cincinnati, O.
 U. S. Stoneware Company, Akron, Ohio, and New York City.
 Universal Zonolite Insulation Co., Chicago (Brick and Cement).
 Walsh Refractories Corp., St. Louis.

REGALVANIZING EQUIPMENT AND MATERIALS

Galv-Weld Products, Dayton, O.

REGISTER SEALS

See Seals for Registers

REGISTER SHIELDS

See Shields, Warm Air Register

REFRIGERATING UNITS

See Compressors, Refrigerating

REGISTERS, DIRECTIONAL FLOW

A-J Manufacturing Co., Kansas City, Mo.

- Air Control Products, Inc., Coopersville, Mich.
 Afro-Fin Grille Co., Detroit.
 • Auer Register Co., Cleveland.
 Barber-Colman Co., Rockford, Ill.
 Best Register Co., Milwaukee, Wis.
 • Char-Gale Mfg. Co., Minneapolis.
 Diamond Manufacturing Co., Wyoming, Pa.
 Elsey Metal Specialties Co., Detroit.
 • Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis.
 • Hart & Cooley Mfg. Co., Holland, Mich.
 Hendrick Mfg. Co., Carbondale, Pa.
 • Independent Register Co., Cleveland.
 Middleton Mfg. & Sales Co., Minneapolis.
 Register & Grille Mfg. Co., Brooklyn.
 • Rock Island Register Co., Rock Island, Ill.
 Standard Stamping & Perforating Co., Chicago.
 Stewart Manufacturing Co., Bloomfield, N. J.
 • Tuttle & Bailey, Inc., New Britain, Conn.
 • United States Air Conditioning Corp., Minneapolis, Minn.
 • United States Register Co., Battle Creek, Mich.
 • Utility Appliance Corp., Los Angeles.
 Waterloo Register Co., Waterloo, Ia.

REGISTERS, HEATING AND VENTILATING

- A-J Manufacturing Co., Kansas City, Mo. (Double Diffuser).
 • Air Control Products, Inc., Coopersville, Mich.
 Afro-Fin Grille Co., Detroit.
 American Warming & Ventilating Co., Toledo, O.
 Anemostat Corporation of America, New York City.
 • Auer Register Co., Cleveland.
 Barber-Colman Co., Rockford, Ill.
 Best Register Co., Milwaukee.
 • Brown Steel Tank Co., Minneapolis.
 Diamond Mfg. Co., Wyoming, Pa.
 • Char-Gale Mfg. Co., Minneapolis.
 Effecto Grille Co., Detroit.
 Empire Ventilation Equipment Co., Long Island City, N. Y.
 • Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis.
 • Hart & Cooley Mfg. Co., Holland, Mich.
 Hendrick Mfg. Co., Carbondale, Pa.
 • Independent Register Co., Cleveland.
 Middleton Mfg. & Sales Co., Minneapolis.
 • Mueller Furnace Co., L. J., Milwaukee.
 Register & Grille Mfg. Co., Inc., Brooklyn.
 • Rock Island Register Co., Rock Island, Ill.
 Standard Stamping & Perforating Co., Chicago.
 Stewart Manufacturing Co., Bloomfield, N. J.
 • Tuttle & Bailey, Inc., New Britain, Conn.
 • United States Register Co., Battle Creek, Mich.
 Waterloo Register Co., Waterloo, Ia.

REGULATORS, DAMPER SETS

- Adams Company, The, Dubuque, Ia.
 • Air Control Products, Inc., Coopersville, Mich.
 • Automatic Products Co., Milwaukee.
 Badger Corporation, Milwaukee.
 Barber-Colman Company, Rockford, Ill.
 • Cole-Sullivan Engineering Co., Minneapolis.
 Fossum Mfg. Co., M. H., St. Paul, Minn.
 • Gerrett Co., M. A., Milwaukee.
 Goese Mfg. Co., Milwaukee.
 • Hart & Cooley Mfg. Co., Holland, Mich.
 Joal Mfg. Corp., Toledo, O.
 Kerentoff, G. L., Cincinnati.
 Kieley & Mueller, Inc., North Bergen, N. J.
 • Merco Corporation, Chicago.
 • Minneapolis-Honeywell Regulator Co., Minneapolis.
 Northern Weatherstrip Co., Duluth, Minn.
 Ohio Products Co., Cleveland.
 • Parker-Kalon Corp., New York City.
 • Penn Electric Switch Co., Goshen, Ind.
 • Perfex Corporation, Milwaukee.
 Richmond Radiator Co., New York City.
 • Sampsel Time Control, Inc., Spring Valley, Ill.
 Sarcotherm Controls, Inc., Chicago.
 Thrush & Co., H. A., Peru, Ind.
 Trane Company, LaCrosse, Wis.
 • United States Register Co., Battle Creek, Mich.
 Young Regulator Co., Cleveland.

REGULATORS, FURNACE DRAFT, MECHANICAL

- Au-Temp-Co Corp., New York City.
 Barber-Colman Co., Rockford, Ill.
 Defender Instrument & Regulator Co., St. Louis.
 Fulton Syphon Co., Knoxville, Tenn.
 • Hart & Cooley Mfg. Co., Holland, Mich.
 Hays Corp., Michigan City, Ind.
 Hotstream Heater Co., Cleveland.
 Little Janitor Furnace Clock Co., New York City.
 • Merco Corporation, Chicago.
 • Minneapolis-Honeywell Regulator Co., Minneapolis.
 Tem Products Co., Midland, Pa.
 Timm & Son, P. C., Lincoln, Nebr.
 Wisconsin Heating & Draft Control Co., Appleton, Wis. (Electric).

RELAYS, ELECTRICAL

- Advance Electric and Relay Co., Los Angeles.
 Allen-Bradley Co., Milwaukee.

• Advertisement in this issue. See Index to Advertisers, page 234.

American Instrument Co., Silver Spring, Md.
 Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
 Au-Temp-Co Corp., New York City.
 Automatic Switch Co., New York City.
 Automatic Temperature Control Co., Inc., Philadelphia.
 B/W Controller Corp., Birmingham, Mich.
 Barber-Colman Co., Rockford, Ill.
 Bardco Mfg. & Sales Co., Los Angeles.
 Benjamin Elec. Mfg. Co., Des Plaines, Ill.
 Clark Controller Co., Cleveland.
 Consolidated Car-Heating Co., Inc., Albany, N. Y.
 Cook Electric Co., Chicago.
 Cooper Co., Clark, Palmyra, N. J.
 Cramer Company, Inc., R. W., Centerbrook, Conn.
 Cutler-Hammer, Inc., Milwaukee.
 Davis & Co., Inc., Dean W., Chicago.
 • Detroit Lubricator Co., Detroit.
 Dunn, Inc., Struthers, Philadelphia.
 Durakool, Inc., Elkhart, Ind. (Mercury).
 Eastern Air Devices, Inc., Brooklyn.
 Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
 Ess Instrument Co., Fort Lee, N. J.
 Friez Instrument Division, Towson, Md.
 • General Controls Co., Glendale, Calif.
 General Electric Co., Schenectady, N. Y.
 • Gleason-Avery, Inc., Auburn, N. Y.
 Guardian Electric Mfg. Co., Chicago.
 H-B Instrument Co., Inc., Philadelphia.
 Hart Mfg. Co., Hartford, Conn.
 Industrial Engineering Corp., Terre Haute, Ind.
 McCorkle Co., D. H., Berkeley, Calif.
 • Merco Corp., Chicago.
 • Minneapolis-Honeywell Regulator Co., Minneapolis.
 Monitor Controller Co., Baltimore.
 National Time & Signal Corp., Detroit.
 • Penn Electric Switch Co., Goshen, Ind.
 • Perfex Corp., Milwaukee.
 Philadelphia Thermometer Co., Philadelphia.
 Precision Thermometer & Instrument Co., Philadelphia.
 Rhodes, Inc., M. H., Hartford, Conn.
 Reynolds Electric Co., Chicago.
 • Sampson Time Control, Inc., Spring Valley, Ill.
 Small Motors, Inc., Chicago.
 Spencer Thermostat Co., Attleboro, Mass.
 Square D Co., Detroit.
 Synchro-Start Products, Chicago.
 Taylor Instrument Companies, Rochester, N. Y.
 Thrush & Co., H. A., Peru, Ind.
 Triplex Mfg. Co., Peru, Ind.
 Ward Leonard Electric Co., Mt. Vernon, N. Y.
 Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
 Weston Electrical Instrument Corp., Newark, N. J.
 Zenith Electric Co., Chicago.

REPAIRS, STOVE AND FURNACE

• Adams Company, The, Dubuque, Ia.
 Associated Heater Parts Co., Chicago.
 Banner Repair Parts Co., Youngstown, O.
 • Brauer Supply Co., A. G., St. Louis.
 Central Furnace & Stove Repair Co., St. Louis.
 Cincinnati Stamping Co., Cincinnati.
 Clark Co., Henry N., Boston.
 • Des Moines Stove Repair Co., Des Moines, Ia.
 Eselgroth & Co., Newark, N. J.
 Faultless Heater Corp., Cleveland.
 Foote Foundry Co., J. B., Fredericktown, O.
 • Homer Furnace & Foundry Corp., Coldwater, Mich.
 Klaine Co., F. A., Cincinnati, O.
 Kramer Bros. Foundry Co., Dayton, O.
 Livingston Repair, Marshall, Mich.
 Metzner Stove Repair Co., Kansas City, Mo.
 Miller & Son, C. Arthur, Elmira, N. Y. (Furnace).
 National Foundry & Furnace Co., Dayton, O.
 • Northwestern Stove Repair Co., Chicago.
 • Omaha Stove Repair Works, Omaha, Neb.
 • Peerless Foundry Co., Indianapolis, Ind.
 Peninsular Stove Co., Detroit.
 Pittsburgh Furnace Parts Co., Pittsburgh.
 Portland Stove Foundry Co., Portland, Me.
 Shamblen Furnace Parts Co., Pittsburgh.
 Stiglitz Furnace & Foundry Co., Louisville, Ky.
 Stove Manufacturing Corporation, Newark, N. J.
 Tri-State Heating Supply Co., Fort Wayne, Ind.

RETIMNING EQUIPMENT and MATERIALS

Galv-Weld Products, Dayton, O.
 Retinning Manufacturing Co., Chicago.

RIDGE ROLLS AND RIDGING (METAL)

• American Rolling Mill Co., Middletown, O. (Galvanized).
 American Steel & Wire Co., Cleveland.
 Ames Co., W. R., San Francisco.
 Barnes Metal Products Co., Chicago.
 Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.
 • Berger Bros. Co., Philadelphia.
 Berger Mfg. Div. of Republic Steel Corp., Canton, O.
 • Bethlehem Steel Co., Bethlehem, Pa. (Metal).
 Biersach & Niedermeyer Co., Milwaukee.
 Chase Brass & Copper Co., Inc., Waterbury, Conn.

Downs-Smith Brass & Copper Co., New York City.
 Edwards Mfg. Co., Inc., Cincinnati.
 • Hussey & Co., C. G., Pittsburgh (Copper).
 • Klauer Mfg. Co., Dubuque, Ia.
 La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
 Lamb & Ritchie Co., Cambridge, Mass.
 Lyon, Conklin & Co., Inc., Baltimore.
 • Milcor Steel Co., Milwaukee.
 New Delphos Manufacturing Co., Delphos, O.
 Newport Rolling Mill Co., Newport, Ky.
 Osborn Co., J. M. & L. A., Cleveland.
 Reeves Steel & Mfg. Co., Dover, O.
 Riffin Metal Products, Kankakee, Ill.
 Ryniker Steel Products Company, Billings, Mont.
 St. Paul Corrugating Co., St. Paul, Minn.
 Schoedinger, F. O., Columbus, O.
 Sheet Metal Mfg. Co., Inc., Brooklyn.
 Sioux Steel Co., Sioux City, S. D.
 Southbridge Roofing Co., Inc., Southbridge, Mass.
 Southern States Iron Roofing Co., Savannah, Ga.
 Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
 Tiffin Eaves Trough Clamp Co., Tiffin, O.
 Van Noorden Co., E., Boston.
 Wheeling Corrugating Co., Wheeling, W. Va.
 Williams-Wallace Co., San Francisco.
 Woolwine Metal Products Co., Los Angeles.

RIDGE VENTILATORS

See Ventilators, Roof, Ridge

RIVETS, ALLOY

• Bethlehem Steel Co., Bethlehem, Pa.
 Clark Bros. Bolt Co., Milldale, Conn.
 General Plate Div., Metals & Controls Corp., Attleboro, Mass. (Silver)
 Hassall, Inc., John, Brooklyn.
 National Screw & Mfg. Co., Cleveland.
 • Republic Steel Corp., Cleveland.
 Townsend Co., New Brighton, Pa.
 Tubular Rivet & Stud Co., Wollaston, Mass.

RIVETS, ALUMINUM

Aluminum Company of America, Pittsburgh.
 Bridgeport Screw Co., Bridgeport, Conn.
 • Cherry Rivet Co., Los Angeles (Blind).
 Chicago Rivet & Machine Co., Bellwood, Ill.
 du Pont de Nemours & Co., E. I., Wilmington, Del. (Explosive).
 Goodrich Co., B. F., Akron, O. (Blind)
 Hassall, Inc., John, Brooklyn.
 Tubular Rivet & Stud Co., Wollaston, Mass.

RIVETS, BRASS, COPPER AND IRON

Blake & Johnson Co., Waterville, Conn.
 Bridgeport Screw Co., Bridgeport, Conn.
 Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
 Chicago Rivet & Machine Co., Bellwood, Ill.
 Clendenin Brothers, Inc., Baltimore (Brass, Copper).
 Conklin Brass & Copper Co., Inc., T. E., New York City.
 Downs-Smith Brass & Copper Co., New York City.
 Goodrich Co., B. F., Akron, O. (Blind-Brass)
 Hassall, Inc., John, Brooklyn.
 • Hussey & Co., C. G., Pittsburgh.
 National Screw & Mfg. Co., Cleveland.
 Taunton & Company, Inc., John H., New York City.
 Townsend Co., New Brighton, Pa.
 Tubular Rivet & Stud Co., Wollaston, Mass.

RIVETS, STEEL

Anti-Corrosive Metal Products Co., Inc., Albany, N. Y. (Stainless)
 Atlantic Steel Company, Atlanta, Ga.
 Atlas Bolt & Screw Co., Cleveland.
 • Bethlehem Steel Co., Bethlehem, Pa.
 Carlin Co., Anthony, Cleveland.
 Chicago Rivet & Machine Co., Bellwood, Ill.
 Clark Bros. Bolt Co., Milldale, Conn.
 National Screw & Mfg. Co., Cleveland.
 • Republic Steel Corporation, Cleveland.
 Townsend Co., New Brighton, Pa.
 Tubular Rivet & Stud Co., Wollaston, Mass.

ROD, GAS WELDING

Air Reduction Sales Co., New York City.
 • American Brass Co., Waterbury, Conn.
 American Steel & Wire Co., Cleveland.
 Atlantic Steel Company, Atlanta, Ga.
 Bridgeport Brass Co., Bridgeport, Conn.
 Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
 Chicago Steel & Wire Co., Chicago.
 Crucible Steel Co. of America, New York City (Stainless).
 Dow Chemical Co., Midland, Mich.
 Duraloy Co., Scottsdale, Pa. (Stainless).
 Eutectic Welding Alloys Company, New York City.
 Imperial Brass Mfg. Co., Chicago.
 International Nickel Co., Inc., New York City (Monel).
 Linde Air Products Co., The, New York City.
 Liquid Carbonic Corp., Chicago.
 Marquette Mfg. Co., Inc., Minneapolis.
 Maurath, Inc., Cleveland.

• Advertisement in this issue. See Index to Advertisers, page 824.

- Milburn Co., Alexander, Baltimore.
 Modern Engineering Co., St. Louis.
 National Cylinder Gas Co., Chicago.
 Page Steel & Wire Div., Monessen, Pa. (Stainless Steel).
 • Revere Copper & Brass, Inc., New York City.
 Torch Weld Equipment Div., National Cylinder Gas Co., Chicago.
 • Universal Power Corporation, Cleveland.
 Victor Equipment Corp., San Francisco.
 Wickwire Spencer Steel Co., New York City.
 Youngstown Sheet & Tube Co., Youngstown, O.

ROLLER BEARINGS

See Bearings, Roller

ROOFING, ALUMINUM

- Air-O-Cel Industries, Inc., Detroit.
 Fingles Co., The, Baltimore.

ROOFING, BUILT-UP

- Air-O-Cel Industries, Inc., Detroit.
 Babbitt-Barber Asphalt Products, Inc., Madison, Ill.
 Barber Co., Inc., Philadelphia.
 Barrett Division, Allied Chemical & Die Corporation, New York City.
 Bird & Son, Inc., East Walpole, Mass.
 Cabot, Inc., Samuel, Boston.
 Carey Co., Philip, Lockland, O.
 Certain-teed Products Corp., New York City.
 Detroit Steel Products Co., Detroit.
 Flintkote Co., New York City.
 Ford Roofing Products Co., Chicago.
 Globe Roofing Products Co., Inc., Whiting, Ind.
 Johns-Manville, New York City.
 Koppers Co., Inc., Pittsburgh. (Pitch and Felt)
 Lehon Company, Chicago.
 Logan-Long Co., Chicago.
 National Mfg. Corp., Tonawanda, N. Y.
 Nelson Mfg. Co., B. F., Minneapolis.
 Reilly Tar & Chemical Corp., Indianapolis.
 Robertson Co., H. H., Pittsburgh.
 Ruberoid Co., New York City.
 Southport Paint Co., Savannah, Ga.
 United States Gypsum Co., Chicago.

ROOFING, COPPER

- American Brass Co., Waterbury, Conn.
 Braden Mfg. Co., Terre Haute, Ind.
 Bridgeport Brass Co., Bridgeport, Conn.
 Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
 Conklin Brass & Copper Co., Inc., T. E., New York City.
 Copper Roofs Corp., Milwaukee.
 Downs-Smith Brass & Copper Co., New York City.
 Edwards Mfg. Co., Inc., Cincinnati.
 Fingles Co., The, Baltimore.
 • Huasey & Co., C. G., Pittsburgh.
 Klauer Manufacturing Co., Dubuque, Ia.
 New Haven Copper Co., Seymour, Conn.
 Perkinson & Brown, Chicago.
 • Revere Copper & Brass, Inc., New York City.

ROOFING, IRON

- American Rolling Mill Co., Middletown, O.
 Berger Mfg. Div., Republic Steel Corp., Canton, O.
 Byers Co., A. M., Pittsburgh (Wrought Iron).
 Cincinnati Sheet Metal & Roofing Co., Cincinnati.
 Globe Iron Roofing & Corrugating Co., Newport, Ky.
 International Steel Company, Evansville, Ind.
 New Delphos Manufacturing Co., Delphos, O.
 Protected Steel Products, Washington, Pa.
 • Republic Steel Corp., Cleveland.
 Southern States Iron Roofing Co., Savannah, Ga.
 Sioux Steel Co., Sioux City, Ia.
 Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
 Tiffin Eaves Trough Clamp Co., Tiffin, O.

ROOFING, LEAD

- Alpha Metals, Inc., Brooklyn.
 American Smelting and Refining Co., New York City.
 Belmont Smelting & Refining Works, Inc., Brooklyn.
 Copper Roofs Corporation, Milwaukee.
 Eagle-Picher Lead Co., Cincinnati.
 Fingles Co., The, Baltimore.
 Flemm Lead Co., Inc., Long Island City, N. Y.
 Illinois Zinc Co., Chicago.
 National Lead Co., New York City.
 Northwest Lead Company, Seattle, Wash.
 Rochester Lead Works, Rochester, N. Y.
 Standard Rolling Mills, Inc., Brooklyn.

ROOFING, SLATE

- Barrett Division, Allied Chemical & Die Corp., New York City
 (Slate Surfaced Shingles and Rolls).
 Jackson-Bangor Slate Co., Pen Argyl, Pa.
 North Bangor Slate Co., Bangor, Pa.
 Norton Brothers, Granville, N. Y.
 Perkinson & Brown, Chicago.
 Rising & Nelson Slate Co., West Pawlet, Vt.
 Sheldon Slate Products Co., Inc., Granville, N. Y. (Colors).
 Structural Slate Co., Pen Argyl, Pa.

- Vendor Slate Co., Inc., Nazareth, Pa.
 Vermont Structural Slate Co., Inc., Fair Haven, Vt.

ROOFING, STEEL

- American Rolling Mill Co., Middletown, O.
 American Steel Band Co., Pittsburgh.
 American Steel & Wire Co., Cleveland.
 Apollo Steel Company, Apollo, Pa.
 Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.
 Berger Mfg. Div. Republic Steel Corp., Canton, O.
 • Bethlehem Steel Co., Bethlehem, Pa.
 Carnegie-Illinois Steel Corp., Pittsburgh.
 • Cheney Metal Products Co., Trenton, N. J. (Protective Coating)
 Cincinnati Sheet Metal & Roofing Co., Cincinnati.
 Columbia Steel Co., Sub. U. S. Steel Corp., San Francisco.
 • Continental Steel Corp., Kokomo, Ind.
 Detroit Steel Products Co., Detroit.
 Edwards Manufacturing Co., Inc., Cincinnati.
 Globe Iron Roofing & Corrugating Co., Newport, Ky.
 Inland Steel Company, Chicago.
 International Steel Company, Evansville, Ind.
 Jones & Laughlin Steel Corp., Pittsburgh.
 Klauer Manufacturing Co., Dubuque, Ia.
 LaCrosse Steel Roofing & Corrugating Co., LaCrosse, Wis.
 • Milcor Steel Co., Milwaukee.
 New Delphos Manufacturing Co., Delphos, O.
 Parkersburg Iron & Steel Co., Parkersburg, W. Va.
 Perkinson & Brown, Chicago.
 Protected Steel Products, Washington, Pa.
 Reeves Steel & Mfg. Co., Dover, O.
 • Republic Steel Corp., Cleveland.
 Robertson Co., H. H., Pittsburgh.
 Sioux Steel Co., Sioux Falls, S. D.
 St. Paul Corrugating Co., St. Paul, Minn.
 Southern States Iron Roofing Co., Savannah, Ga.
 Superior Sheet Steel Co. Div. Continental Steel Corp., Canton, O.
 Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
 Tiffin Eaves Trough Clamp Co., Tiffin, O.
 Truscon Steel Co., Youngstown, O.
 Wheeling Corrugating Co., Wheeling, W. Va.
 Wheeling Steel Corporation, Wheeling, W. Va.

ROOFING, TERNE PLATE

- Berger Mfg. Div., Republic Steel Corp., Canton, Ohio.
 • Bethlehem Steel Co., Bethlehem, Pa.
 Carnegie-Illinois Steel Corp., Pittsburgh.
 Cincinnati Sheet Metal & Roofing Co., Cincinnati.
 • Follansbee Steel Corporation, Pittsburgh, 30.
 Klauer Manufacturing Co., Dubuque, Ia.
 • Milcor Steel Co., Milwaukee.
 New Delphos Manufacturing Co., Delphos, O.
 • Republic Steel Corp., Cleveland.
 Sioux Steel Co., Sioux Falls, S. D.
 Southern States Iron Roofing Co., Savannah, Ga.
 Tiffin Eaves Trough Clamp Co., Tiffin, O.
 Wheeling Corrugating Company, Wheeling, W. Va.
 Wheeling Metal & Mfg. Co., Moundsville, W. Va.
 Wheeling Steel Corp., Wheeling, W. Va.
 Youngstown Sheet & Tube Co., Youngstown, O.

ROOFING, TILE (CLAY & CONCRETE)

- Hood Co., B. Mifflin, Daisy, Tenn. (Clay).
 Ludowici-Celadon Co., Chicago.
 Murray Tile Co., Cloverport, Ky.
 National Fireproofing Corp., Pittsburgh.
 Perkinson & Brown, Chicago.
 Truscon Laboratories, Detroit.
 United States Gypsum Co., Chicago.

ROOFING, TIN

- Berger Mfg. Div. of Republic Steel Corp., Canton, O.
 Carnegie-Illinois Steel Corp., Pittsburgh.
 Cincinnati Sheet Metal & Roofing Co., Cincinnati.
 • Follansbee Steel Corporation, Pittsburgh.
 Klauer Manufacturing Co., Dubuque, Ia.
 • Milcor Steel Co., Milwaukee.
 New Delphos Manufacturing Co., Delphos, O.
 Perkinson & Brown, Chicago.
 • Republic Steel Corp., Cleveland.
 Sioux Steel Co., Sioux Falls, S. D.
 Southern States Iron Roofing Co., Savannah, Ga.
 Wheeling Corrugating Co., Wheeling, W. Va.
 Wheeling Steel Corp., Wheeling, W. Va.

ROOFING, ZINC

- American Zinc Products Co., Greencastle, Ind.
 Barnes Metal Products Co., Chicago.
 Edwards Mfg. Co., Inc., Cincinnati.
 Hegeler Zinc Company, Danville, Ill.
 Illinois Zinc Co., Chicago.
 Matthiessen & Hegeler Zinc Co., La Salle, Ill.
 New Jersey Zinc Co., New York City.
 Southern States Iron Roofing Co., Savannah, Ga.
 Wheeling Corrugating Co., Wheeling, W. Va. (Coated).
 Wheeling Steel Corp., Wheeling, W. Va. (Coated).

ROOFTRIM, STEEL (MOULDINGS) FOR EAVES AND RAKES

- Penn Supply & Metal Corp., Philadelphia.

• Advertisement in this issue. See Index to Advertisers, page 324.

RUST PROTECTION FOR METALS

See Chemicals, Rust Preventive

SAFETY GLASS

See Glass, Safety

SANDERS

See Buffers, Grinders, Polishers and Sanders

SAVERS, HEAT

- Barclay, Inc., Robert, Chicago.
- Cary Mfg. Co., Waupaca, Wis.
- Condensation Engineering Corp., Chicago.
- Gerhardt, W. F., Richmond, Va. (oil or gas).
- Harvey-Whipple, Inc., Springfield, Mass.
- Leader Iron Works, Inc., Decatur, Ill.
- Meyers Fuel Saver Co., Inc., Janesville, Wis.
- Reynolds Electric Co., Chicago.
- Woolery Machine Co., Minneapolis, Minn.

SAWS, BAND, SHEET METAL CUTTING

- Atkins and Co., E. C., Indianapolis.
- Barnes, W. O., Detroit.
- Continental Machines Incorporated, Minneapolis (Rotary).
- Diston & Sons, Inc., Henry, Philadelphia.
- Doall Company, Des Plaines, Ill.
- Grob Brothers, Grafton, Wis.
- Diston & Sons, Inc., Henry, Tacony Sta., Philadelphia.
- Kalamazoo Tank & Silo Co., Kalamazoo, Mich.
- Skillsaw, Inc., Chicago.
- Tannewitz Works, Grand Rapids, Mich.
- Wells Mfg. Corp., Three Rivers, Mich.

SAWS, HACK, POWER

- Atkinson and Co., E. C., Indianapolis.
- Champion Blower & Forge Co., Lancaster, Pa.
- Chicago Precision Equipment Co., Chicago.
- Clemenson Bros., Inc., Middletown, N. Y.
- Diston & Sons, Inc., Henry, Tacony Sta., Philadelphia.
- Johnson Manufacturing Corporation, Albion, Mich. (Wet for high speed).
- Robertson, F. L., Buffalo.
- Royersford Foundry & Machine Co., Royersford, Pa.
- Synton Co., Homer City, Pa. (Electric, semi-portable).
- Wells Manufacturing Corp., Three Rivers, Mich.

SCREENS, SUN REFLECTING

- Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.

SCREWS, DRIVE

- American Screw Co., Providence, R. I.
- Anti-Corrosive Metal Products Co., Inc., Albany, N. Y. (Stainless)
- Continental Screw Co., New Bedford, Mass.
- Corbin Screw Corp., New Britain, Conn.
- Elco Tool & Screw Corporation, Rockford, Ill.
- Hassall, Inc., John, Brooklyn.
- Hillwood Manufacturing Co., Cleveland.
- National Lock Co., Rockford, Ill.
- National Screw & Mfg. Co., Cleveland.
- Parker-Kalon Corp., New York City (Hardened Metallic).
- Pheoll Manufacturing Co., Chicago.
- Townsend Co., New Brighton, Pa.
- Turner & Seymour Mfg. Co., Torrington, Conn.

SCREWS, FEED, STOKER

- Bros Boller & Mfg. Co., Wm., Minneapolis.
- Burnside Steel Foundry Co., Chicago.
- Chicago Steel Foundry Co., Chicago.
- Crown Iron Works, Minneapolis, Minn.
- Davy Fuel & Supply Co., Stoker Div., Detroit.
- Farrell-Cheek Steel Co., Stoker Parts Div., Sandusky, O.
- Wyoming Stoker Worm Co., Wyoming, Pa.

SCREWS, SELF-TAPPING

- American Screw Co., Providence, R. I.
- Anti-Corrosive Metal Products Co., Inc., Albany, N. Y. (Stainless)
- Atlas Bolt & Screw Co., Cleveland.
- Continental Screw Co., New Bedford, Mass.
- Corbin Screw Corporation, New Britain, Conn.
- Elco Tool & Screw Corporation, Rockford, Ill.
- National Lock Co., Rockford, Ill.
- National Screw & Mfg. Co., Cleveland.
- Parker-Kalon Corp., New York City.
- Pheoll Manufacturing Co., Chicago.
- Shakeproof, Inc., Chicago.
- United States Register Co., Battle Creek, Mich.

SCREWS, SHEET METAL

- Aluminum Co. of America, Pittsburgh (Aluminum).
- American Screw Co., Providence, R. I.
- Anti-Corrosive Metal Products Co., Inc., Albany, N. Y. (Stainless Steel).
- Atlas Bolt & Screw Co., Cleveland.

- Continental Screw Co., New Bedford, Mass.
- Corbin Screw Corporation, New Britain, Conn.
- Elco Tool & Screw Corporation, Rockford, Ill.
- National Lock Co., Rockford, Ill.
- National Screw & Mfg. Co., Cleveland.
- Parker-Kalon Corp., New York City.
- Pheoll Manufacturing Co., Chicago.
- Shakeproof, Inc., Chicago.
- Townsend Co., New Brighton, Pa.
- United States Register Co., Battle Creek, Mich.

SEALS for REGISTERS

- Excel Heating & Air Conditioning Co., Chicago.

SEAMER MACHINES

See Machines, Seaming

SETTING DOWN MACHINES

See Machines, Setting Down

SHEARS, CIRCLE, HAND

- Crescent Tool Co., Jamestown, N. Y.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Wiss & Sons Co., J., Newark, N. J.

SHEARS, CIRCLE, POWER

- Libert Machine Co., Green Bay, Wis.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Whiting Corp., Harvey, Ill.
- Wysong & Miles Co., Greensboro, N. C.
- Yoder Company, Cleveland.

SHEARS, HAND AND BENCH

See Snips and Shears, Bench and Hand

SHEARS AND PUNCHES COMBINED

See Punches and Shears Combined

SHEARS, ELECTRIC, PORTABLE

- Black & Decker Mfg. Co., Towson, Md.
- C-B Tool Co., Lancaster, Pa. (Cutting Head only).
- G. D. S. Machinery & Supply Co., New York City.
- Independent Pneumatic Tool Co., Chicago.
- O'Neill-Irwin Manufacturing Co., Minneapolis.
- Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.
- Van Dorn Electric Tool Co., Towson, Md.
- York Electric and Machine Company, York, Pa.

SHEARS, ROTARY, SLITTING, HAND

- Marshalltown Manufacturing Co., Marshalltown, Ia.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Rafter Machine Co., Belleville, N. J.
- Wagner, C. DeWitt, Cedar Rapids, Ia.

SHEARS, SQUARING, FOOT

- Barth Mfg. Co., Milldale, Conn.
- Bertsch & Co., Cambridge City, Ind.
- Famco Machine Co., Racine, Wis.
- Niagara Machine & Tool Works, Buffalo.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Royersford Foundry & Machine Co., Royersford, Pa.
- Wysong & Miles Co., Greensboro, N. C.

SHEARS, SQUARING, POWER

- Beatty Machine & Mfg. Co., Hammond, Ind.
- Bertsch & Co., Cambridge City, Ind.
- Bliss & Co., E. W., Toledo, O.
- Cincinnati Shaper Co., Cincinnati.
- Cleveland Punch & Shear Works Co., Cleveland.
- Excelsior Tool and Machine Co., East St. Louis, Ill.
- Niagara Machine & Tool Works, Buffalo.
- O'Neill-Irwin Manufacturing Co., Minneapolis.
- Peck, Stow & Wilcox Co., Southington, Conn.
- Streine Tool & Mfg. Co., New Bremen, O.
- Whitney Metal Tool Company, Rockford, Ill.
- Wysong & Miles Co., Greensboro, N. C.

SHEET METAL PARTS

See Mouldings and Trim; also Stampings, Metal

SHEETS, ALUMINUM

- Aluminum Company of America, Pittsburgh.
- American Nickeloid Company, Peru, Ill.
- Fairmont Aluminum Co., Fairmont, W. Va.

SHEETS, CLAD

- Allegheny Ludlum Steel Corp., Brackenridge, Pa.
- Aluminum Company of America, Pittsburgh.
- American Nickeloid Company, Peru, Ill. (Nickel, Chromium, Brass, Copper).
- American Rolling Mill Co., Middletown, O. (Aluminum)

• Advertisement in this issue. See Index to Advertisers, page 324.

General Plate, Div. Metals & Controls Corp., Attleboro, Mass.
(Precious to Base Metal)
Granite City Steel Company, Granite City, Ill.
Ingersoll Steel & Disc Div. Borg-Warner Corp., Chicago.
Jessop Steel Co., Washington, Pa. (Stainless).
Lamb & Ritchie Co., Cambridge, Mass. (Lead).
Lukens Steel Co., Coatesville, Pa. (Nickel, Monel, Inconel)

SHEETS, COPPER

- American Brass Co., Waterbury, Conn.
- American Nickeloid Co., Peru, Ill.
- Bridgeport Brass Co., Bridgeport, Conn.
- Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
- Conklin Brass & Copper Co., Inc., T. E., New York City.
- Downs-Smith Brass & Copper Co., Inc., New York City.
- Hussey & Co., C. G., Pittsburgh.
- New Haven Copper Co., Seymour, Conn.
- Revere Copper & Brass, Inc., New York City.
- U. S. Brass & Copper Co., Hyde Park, Mass.
- Weirton Steel Co., Weirton, W. Va. (Electrolytic Zinc Coated)
- Western Brass Mill Div., Olin Industries, Inc., East Alton, Ill. (Brass, Bronze, Phosphor Bronze).

SHEETS, COPPER, LEAD COATED

- American Brass Co., Waterbury, Conn.
- Bridgeport Brass Co., Bridgeport, Conn.
- Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
- Downs-Smith Brass & Copper Co., New York City.
- Hussey & Co., C. G., Pittsburgh.
- Lamb & Ritchie Co., Cambridge, Mass.
- Ledcote Products Co., Long Island City, N. Y.
- New Haven Copper Co., Seymour, Conn.
- Revere Copper & Brass, Inc., New York City.
- U. S. Brass & Copper Co., Hyde Park, Mass.

SHEETS, GALVANNEALED

- Berger Mfg. Div., Republic Steel Corp., Canton, O.
- Carnegie-Illinois Steel Corp., Pittsburgh.
- Continental Steel Corp., Kokomo, Ind.
- Newport Rolling Mill Co., Div., Andrews Steel Co., Newport, Ky.
- Republic Steel Corp., Cleveland.
- Sharon Steel Corp., Sharon, Pa.
- Superior Sheet Steel Co., Canton, O.
- Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, LEAD

- Alpha Metals, Inc., Brooklyn.
- American Smelting and Refining Co., New York City.
- Belmont Smelting & Refining Works, Inc., Brooklyn.
- Continental Steel Corp., Kokomo, Ind.
- Down-Smith Brass & Copper Co., Inc., New York City.
- Eagle-Picher Lead Co., Cincinnati.
- Flemm Lead Co., Inc., Long Island City, N. Y.
- Illinois Zinc Co., Chicago.
- Lisberger & Son, Inc., Marks, Long Island City, N. Y.
- National Lead Co., New York City.
- Northwest Lead Company, Seattle, Wash.
- Rochester Lead Works, Rochester, N. Y.
- Standard Rolling Mills, Inc., Brooklyn.
- Weirton Steel Co., Weirton, W. Va. (Alloy Coated)

SHEETS, MAGNESIUM ALLOY

Dow Chemical Co., Midland, Mich.

SHEETS, MONEL

International Nickel Company, Inc., New York City.

SHEETS, NICKEL

International Nickel Co., Inc., New York City.

SHEETS, SPECIAL METAL

(Nickel Zinc, Chrome Zinc, Nickel Coated Copper, Chromium Coated Copper, Nickel Coated Steel, Chromium Coated Steel, Chromium Coated Nickel Silver, Zinc Brass, Zinc Copper, etc.)

- Allegheny Ludlum Steel Corp., Brackenridge, Pa. (Alloy Electrical)
- American Brass Co., Waterbury, Conn. (Copper-Silicon Alloys)
- American Nickeloid Co., Peru, Ill.
- Apollo Metal Works, Chicago. (Nickel Zinc, Nickel Copper, Chrom Copper, Chrom Steel, Nickel Steel, Zinc Steel, Chrom Brass)
- Apollo Steel Co., Apollo, Pa.
- Bethlehem Steel Co., Bethlehem, Pa.
- Chase Brass & Copper Co., Incorporated, Waterbury, Conn. (Muntz Metal, Nickel Silver, Phosphor Bronze).
- Duriron Company, Inc., Dayton, O.
- Hussey & Co., C. G., Pittsburgh.
- Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.
- International Nickel Co., Inc., New York City. (Inconel)
- Lyon, Conklin & Co., Inc., Baltimore.
- Maysteel Products, Inc., Mayville, Wis.
- National Sheet Metal Co., Peru, Ill.
- Reeves Steel & Manufacturing Co., Dover, O.
- Republic Steel Corp., Cleveland.

Western Brass Mill Div., Olin Industries, Inc., East Alton, Ill. (Non-Ferrous).

SHEETS, STAINLESS

- Allegheny Ludlum Steel Corp., Brackenridge, Pa.
- American Rolling Mill Co., Middletown, O.
- Carnegie-Illinois Steel Corp., Pittsburgh.
- Colonial Alloys Co., Philadelphia.
- Crucible Steel Co. of America, New York City (Two-Ply).
- Eastern Stainless Steel Corp., Baltimore, Md.
- Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.
- Jessop Steel Co., Washington, Pa.
- Republic Steel Corp., Cleveland.
- Sharon Steel Corp., Sharon, Pa.
- Superior Steel Corp., Pittsburgh.
- Universal-Cyclops Steel Corp., Bridgeville, Pa.

SHEETS, STEEL

(Polished and Blue, Corrugated and Plain, Black, Terne and Galvanized)

- American Rolling Mill Co., Middletown, O.
- American Steel & Wire Co., Cleveland (Galvanized).
- Apollo Steel Co., Apollo, Pa.
- Berger Mfg. Div., Republic Steel Corp., Canton, O.
- Bethlehem Steel Co., Bethlehem, Pa.
- Carnegie-Illinois Steel Corp., Pittsburgh.
- Columbia Steel Co., San Francisco.
- Continental Steel Corp., Kokomo, Ind.
- Crucible Steel Company of America, New York City.
- Empire Sheet & Tin Plate Co., Mansfield, O.
- Follansbee Steel Corporation, Pittsburgh 30.
- Granite City Steel Co., Granite City, Ill.
- Great Lakes Steel Corporation, Detroit.
- Inland Steel Co., Chicago.
- Jessop Steel Co., Washington, Pa. (Carbon, High-Speed, Alloy)
- Jones & Laughlin Steel Corp., Pittsburgh.
- Lyon, Conklin & Co., Inc., Baltimore.
- Newport Rolling Mill Co., Newport, Ky.
- Niles Rolling Mill Co., Niles, O.
- Parkersburg Iron & Steel Co., Parkersburg, W. Va.
- Reeves Steel & Mfg. Co., Dover, O.
- Republic Steel Corp., Cleveland.
- Sharon Steel Co., Sharon, Pa.
- Superior Sheet Steel Co., Canton, O. (Galvanized, Hot Rolled and Long Ternes).
- Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
- Weirton Steel Co., Weirton, W. Va.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Wheeling Steel Corp., Wheeling, W. Va.
- Wood Steel Company, Alan, Conshohocken, Pa.
- Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, STEEL, COPPER BEARING

- American Rolling Mill Co., Middletown, O.
- Berger Mfg. Div., Republic Steel Corp., Canton, O.
- Bethlehem Steel Co., Bethlehem, Pa.
- Carnegie-Illinois Steel Corp., Pittsburgh.
- Columbia Steel Co., San Francisco.
- Continental Steel Corp., Kokomo, Ind.
- Follansbee Steel Corporation, Pittsburgh.
- Granite City Steel Co., Granite City, Ill.
- Inland Steel Co., Chicago. (Copper Alloy, Zinc Alloy)
- Jones & Laughlin Steel Corp., Pittsburgh.
- Newport Rolling Mill Co., Newport, Ky.
- Reeves Mfg. Co., Dover, O.
- Republic Steel Corp., Cleveland.
- Sharon Steel Co., Sharon, Pa.
- Superior Sheet Steel Co., Canton, O.
- Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
- Weirton Steel Co., Weirton, W. Va.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Wheeling Steel Corp., Wheeling, W. Va.
- Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, TIN PLATE

- Bethlehem Steel Co., Bethlehem, Pa.
- Carnegie-Illinois Steel Corp., Pittsburgh.
- Crucible Steel Company of America, New York City.
- Follansbee Steel Corporation, Pittsburgh.
- Granite City Steel Co., Granite City, Ill.
- Inland Steel Co., Chicago.
- Jones & Laughlin Steel Corp., Pittsburgh (Tinned).
- Lyon, Conklin & Co., Inc., Baltimore.
- Republic Steel Corp., Cleveland.
- Rochester Lead Works, Inc., Rochester, N. Y.
- Sharon Steel Corp., Sharon, Pa.
- Weirton Steel Co., Weirton, W. Va.
- Wheeling Corrugating Co., Wheeling, W. Va.
- Wheeling Steel Corp., Wheeling, W. Va.
- Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, ZINC

- American Nickeloid Co., Peru, Ill.
- American Zinc Products Co., Greencastle, Ind.
- Belmont Smelting & Refining Works, Inc., Brooklyn.
- Downs-Smith Brass & Copper Co., Inc., New York City.
- Hegeler Zinc Co., Danville, Ill.

* Advertisement in this issue. See Index to Advertisers, page 824.

Illinois Zinc Co., Chicago.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
New Jersey Zinc Co., New York City.

SHIELDS, WARM AIR REGISTER

Gammeter Co., W. F., Cadiz, O. (With Humidifier).
Kauffman Air Conditioning Corp., St. Louis.
Marshall Mfg. Co., Cleveland.
Patent Novelty Company, Fulton, Ill. (With humidifier).
Pentecost & Craft Co., Terra Haute, Ind.
Schoedinger, F. O., Columbus, O.

SHINGLES AND TILE, METAL

Ames Company, W. R., San Francisco.
Berger Manufacturing Div., Republic Steel Corp., Canton, O.
Cincinnati Sheet Metal & Roofing Co., Cincinnati.
Edwards Manufacturing Co., Inc., Cincinnati.
Fingles Co., The, Baltimore.
Globe Iron Roofing & Corrugating Co., Newport, Ky. (galvanized and painted terne).
Herbert & Sons, T. L., Nashville, Tenn.
Miller & Doing, Brooklyn.
New Haven Copper Co., Seymour, Conn. (Copper).
Reeves Steel & Mfg. Co., Dover, O. (Galvanized).
Sheet Metal Mfg. Co., Inc., Brooklyn.
Southern States Iron Roofing Co., Savannah, Ga.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. (Galv Steel).
Tiffin Eaves Trough Clamp Co., Tiffin, O.
Wheeling Corrugating Co., Wheeling, W. Va. (steel shingles).
Williams-Wallace Co., San Francisco (Painted tin and galv.).

SHRINKING MACHINES

See Machines, Shrinking

SHUTTERS

See Louvers and Shutters

SHUTTERS & DOORS, FIRE

See Doors and Shutters, Fire

SKYLIGHT LIFTS

See Lifts, Skylight

SKYLIGHTS

Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
American Sheet Metal Works, New Orleans, La.
Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.
Biersach & Niedermeyer Co., Milwaukee.
Cincinnati Sheet Metal & Roofing Co., Cincinnati.
Danzon Metal Works Co., Hagerstown, Md.
Edwards Mfg. Co., Inc., Cincinnati.
Fingles Co., The, Baltimore.
Gehrl Company, Tacoma, Wash.
General Sheet Metal Works, Inc., Bridgeport, Conn. (Puttyleas).
Herbert & Sons, T. L., Nashville, Tenn.
Hirschman Co., Inc., W. F., Buffalo.
International Steel Co., Evansville, Ind.
Klauer Mfg. Co., Dubuque, Ia.
LaCrosse Steel Roofing & Corrugating Co., LaCrosse, Wis.
Lee & Son Co., Thomas, Cincinnati.
Main Cornice Works, Los Angeles.
Mesker & Co., Geo. L., Evansville, Ind.
Midwest Aluminum Products, Inc., Milwaukee.
Moeschl-Edwards Corrugating Co., Inc., Cincinnati.
Northern Furnace & Supply Co., Billings, Mont.
Perkinson & Brown, Chicago.
Riester & Thesmacher Co., Cleveland.
Riggin Metal Products, Kankakee, Ill.
Robertson Co., H. H., Pittsburgh (Structural).
Ryniker Steel Products Company, Billings, Mont.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger, F. O., Columbus, O.
Sioux Steel Co., Sioux Falls, S. D.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Steinhorst & Sons, Inc., Emil, Utica, N. Y.
Van Noorden Co., E., Boston.
Vent-O-Lite Co., Chicago. (Industrial, Ventilating, Puttless).
Ward Co., H. H., Chester, Pa.
Willis Steel Corporation, Galesburg, Ill.
Winkler & Sons, Inc., A. E., Milwaukee.
York Corrugating Co., York, Pa.

SLEEVE BEARINGS

See Bearings, Sleeve

SLITTING MACHINES

See Machines, Slitting

SMOKE PIPE

See Pipe, Smoke

SNIPS AND SHEARS, BENCH AND HAND

Armstrong-Blum Mfg. Co., Chicago.
Bartlett Mfg. Co., Detroit.
Bergman Tool Mfg. Co., Buffalo (Bench).
Berridge Shear Co., Sturgis, Mich.
• Beverly Shear Co., Chicago.
• Bremil Mfg. Co., Erie, Pa. (Shears).
• Class Shear Co., Fremont, O. (hand).
Compton Shear Co., W. H., Newark, N. J.

- Crescent Tool Co., Jamestown, N. Y.
- G. D. S. Machinery & Supply Co., New York City.
- Grobet File Corp. of America, New York City.
- Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
- Klenk's Aviation Snips, Wilmington, Del.
- O'Neil-Irwin Manufacturing Co., Minneapolis.
- Packham Crimper Company, Mechanicsburg, O. (Rotary Snips).
- Peck, Stow & Wilcox Co., Southington, Conn.
- Penn Tool Company, Philadelphia.
- Reiner & Campbell Co., Inc., Elizabeth, N. J.
- Snap-On Tools Corporation, Kenosha, Wis.
- Viking Shear Co., Erie, Pa. (Shears).
- Wiss & Sons Co., J., Newark, N. J.

SNOW GUARDS

See Guards, Snow

SOLDER

- Air Reduction Sales Co., New York City.
- Allen Co., Inc., L. B., Chicago. (Aluminum and Stainless Steel).
- Alpha Metals Inc., Brooklyn (Silver & Tin-Lead).
- American Brass Co., Waterbury, Conn.
- American Smelting & Refining Co., New York City (Lead-Silver and Silver).
- American Solder & Flux Co., Philadelphia (paste).
- Belmont Smelting & Refining Works, Inc., Brooklyn (all kinds).
- Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
- Conklin Brass & Copper Co., Inc., T. E., New York City.
- Downs-Smith Brass & Copper Co., New York City.
- Eagle-Picher Lead Co., Cincinnati (Bar and Wire).
- Eastern States Supply Co., Brooklyn.
- Empire Metal Co., Syracuse, N. Y.
- Farrelloy Company, Inc., Philadelphia.
- Flemm Lead Co., Inc., Long Island City.
- Galv-Weld Products, Dayton, O. (Repair)
- Gardner Metal Co., Chicago.
- Glaser Lead Co., Inc., Brooklyn.
- Handy & Harman, New York City (silver).
- Industrial Service Laboratories, Milwaukee.
- Jiggers, Inc., Chicago (Kit).
- Johnson Co., Lloyd S., Chicago.
- Kester Solder Co., Chicago (Bar, Solid, Self-Fluxing Wire).
- Klauer Mfg. Co., Dubuque, Ia.
- Lenk Mfg. Company, Newton Lower Falls, Mass.
- Lissberger & Son, Inc., Marks, Long Island City, N. Y.
- Lukens Metal Co., Thos. F., Philadelphia.
- Merchant & Evans Co., Philadelphia.
- Motex Metal Process Corporation, Detroit.
- National Lead Co., New York City.
- New Delphos Manufacturing Co., Delphos, O.
- Northwest Lead Company, Seattle, Wash.
- Ruby Chemical Co., Columbus, O. (Acid and Rosin Core).
- Ryerson & Son, Inc., Joseph T., Chicago.
- Sheet Metal Mfg. Co., Inc., Brooklyn.
- Standard Rolling Mills, Inc., Brooklyn.

SOLDERING COPPERS

See Coppers, Soldering

SOLDERING FLUX

See Flux, Soldering

SOLDERING FURNACES

See Furnaces, Soldering

SOLDERING IRONS

See Coppers, Soldering

SOLDERING TORCHES

See Torches, Soldering

SOLENOID VALVES

See Valves, Solenoid

SOUND LEVEL INDICATORS

See Indicators, Sound Level

SPOT WELDERS

See Welders, Spot

SPRAY GUNS

See Guns, Spray

SQUARING MACHINES

See Machines, Squaring

STAMPINGS, METAL

Ackermann Manufacturing Company, Wheeling, W. Va.
Ames Co., W. R., San Francisco.
Anti-Corrosive Metal Products Co., Inc., Albany, N. Y. (Stainless)
Bossert Company, Inc., Utica, N. Y.
Burgess-Norton Mfg. Co., Geneva, Ill.
Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
Chicago Metal Mfg. Co., Chicago (Rings).
Commercial Shearing & Stamping Co., Youngstown, O.
Dahlstrom Metallic Door Co., Jamestown, N. Y.
Dayton Rogers Mfg. Co., Minneapolis.
Detroit Stamping Co., Detroit.
Edwards Mfg. Co., Inc., Cincinnati.
Friedley-Voshardt Co., Chicago.
General Metal Products Co., St. Louis.
Gerock Bros. Mfg. Co., St. Louis.

• Advertisement in this issue. See Index to Advertisers, page 324.

- Geuder, Paeschke & Frey Co., Milwaukee.
- Gillian Mfg. Co., Detroit.
- Globe Machine & Stamping Co., Cleveland.
- Grammes & Sons, Inc., L. F. Allentown, Pa.
- H P L Manufacturing Co., Cleveland.
- Kirk & Blum Mfg. Co., Cincinnati.
- Lukens Steel Company, Coatesville, Pa.
- Maysteel Products, Inc., Mayville, Wis.
- Miller & Doing, Brooklyn.
- Morrison Products, Inc., Cleveland.
- Morrison Steel Products, Inc., Buffalo.
- Mullins Mfg. Co., Warren, O.
- National Manufacturing & Engineering Co., Detroit.
- National Metal Fabricators, Chicago.
- New Delphos Manufacturing Co., Delphos, O.
- New Monarch Machine & Stamping Co., Des Moines, Ia.
- Niles Steel Products Div., Republic Steel Corp., Niles, O.
- Osborn Co., J. M. & L. A., Cleveland, O.
- Revere Copper & Brass, Inc., New York City.
- Schwitzer-Cummins Company, Indianapolis.
- Service Machine Co., Elizabeth, N. J.
- Standard Pressed Steel Co., Jenkintown, Pa.
- Standard Stamping & Perforating Co., Chicago.
- Tannewitz Works, Grand Rapids, Mich.
- Truscon Steel Co., Youngstown, O.
- United States Register Co., Battle Creek, Mich.
- Waterman-Waterbury Co., Minneapolis.
- Western Brass Mill Div., Olin Industries, Inc., East Alton, Ill.
- Worcester Pressed Steel Co., Worcester, Mass.
- York Corrugating Co., York, Pa.

STAMPINGS, STEEL FURNACE

Ackermann Manufacturing Company, Wheeling, W. Va.
Commercial Shearing & Stamping Co., Youngstown, O. (Flanged and Dished Heads for Furnace Domes, Radiator Crescent Heads, Hat Pipes).

STEEL FRAMING

See Framing, for Housing Assemblies

STOKER CONTROLS

See Controls, Stoker

STOKER DRIVES

See Drives, Stoker

STOKER SCREWS OR WORKS

See Screws, Feed, Stoker

STOKERS, DOMESTIC

(Up to 61 lb. per hr.)

- Advance Appliance Co., Inc., Peoria, Ill.
- Air Conditioning & Stokers, Inc., St. Louis.
- American Furnace Co., St. Louis.
- Anchor Stove & Range Co., New Albany, Ind.
- Auburn Burner Co., Auburn, Ind.
- Auburn Foundry, Inc., Stoker Div., Auburn, Ind.
- Bardes Range & Foundry Co., E. H., Cincinnati.
- Beckley Perforating Co., Garwood, N. J. (Anthracite).
- Black Servant Stoker Co., St. Louis.
- Bovee Furnace Works, Waterloo, Ia.
- Bros Boiler & Mfg. Co., Wm., Minneapolis.
- Brownie Stoker Co., Decatur, Ill.
- Brownell Co., Dayton, O.
- Bryant Heater Co., Cleveland. (Coke)
- Burnham Stoker Co., Vancouver, Wash.
- Burnwell Corp., Allentown, Pa.
- Butler Street Foundry & Iron Co., Chicago.
- Canton Stoker Corp., Canton, O.
- Carpenter Heating & Stoker Company, Cleveland.
- Catskill Metal Works, Inc., Catskill, N. Y.
- Central Rubber & Steel Corp., Findlay, O.
- Chicago Automatic Stoker Co., Inc., Chicago.
- Coal-O-Matic Stoker Company, Trucksville, Pa. (Anthracite).
- Conco Corporation, Mendota, Ill.
- Consolidated Industries, Inc., Lafayette, Ind.
- Cooper & Cooper, Inc., Pittsfield, Mass. (Anthracite).
- Cotta Transmission Corp., 2340 Eleventh St., Rockford, Ill.
- Crane Co., Chicago (Bituminous & Anthracite).
- Davy Fuel & Supply Co., Stoker Div., Detroit (Bituminous).
- Delco Appliance Div., General Motors Corp., Rochester, N. Y. (Bituminous).
- Dickson Coal Co., New York City.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Eddy Stoker Corp., Chicago.
- Electric Furnace-Man, Inc., Emmaus, Pa.
- Excelsior Stove & Mfg. Co., Quincy, Ill.
- Fairbanks, Morse & Co., Chicago.
- Foy Stoker Mfg. Co., Chicago.
- Freed Heater & Stoker Company, Collegeville, Pa. (Anthracite).
- Frederick Iron & Steel Co., Frederick, Md.
- Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis
- Fuel Savers, Inc., Harrisburg, Pa.
- Gehl Bros. Mfg. Co., West Bend, Wis.
- General Machine Co., Inc., Emmaus, Pa.
- Green Colonial Furnace Co., Des Moines, Ia.
- Grossenbacher Furnace Co., St. Louis.
- Hall-Neal Furnace Co., Indianapolis, Ind.

- Heating Assurance, Spokane, Wash.
- Hemp & Co., Inc., Macomb, Ill.
- Heritage Coal & Stoker Co., Chicago.
- Hershey Machine & Foundry Co., Manheim, Pa.
- Hess Warming and Ventilating Co., Chicago.
- Holcomb & Hoke Mfg. Co., Indianapolis.
- Homer Furnace & Foundry Corp., Coldwater, Mich.
- Ideal Furnace Co., Detroit.
- Illinois Iron & Bolt Co., Chicago.
- Iron Fireman Mfg. Co., Cleveland.
- Jacobson Machine Works, Inc., A. E., Minneapolis.
- Keith Furnace Co., Des Moines, Ia.
- Kingston Products Corporation, Kokomo, Ind.
- Kol-Master Corp., Oregon, Ill.
- Link-Belt Co., Chicago.
- Malco Gear Co., Dolton, Ill.
- Meyer Furnace Co., Peoria, Ill.
- Muncie Gear Works, Inc., Muncie, Ind.
- Murray Corporation of America, Detroit.
- National Steam Pump Co., Upper Sandusky, O.
- Northern Steel & Stoker Corp., Peoria, Ill.
- Palmer Mfg. Co., Cleveland.
- Peerless Mfg. Co., Louisville, Ky.
- Plymouth Industries, Inc., Plymouth, Ind.
- Pocahontas Fuel Co., Inc., Stoker Div., Cleveland.
- Racine Stoker Mfg. Co., Racine, Wis.
- Rheem Manufacturing Co., Stokermatic Div., Salt Lake City.
- Round Oak Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- Schwab Furnace Co., Milwaukee, Wis.
- Schwab Safe Co., Lafayette, Ind.
- Schwitzer-Cummins Company, Indianapolis.
- Scott Engineering Co., Noblesville, Ind.
- Scott-Newcomb, Inc., St. Louis.
- Sinker-Davis Co., Indianapolis.
- Smith Corporation, A. O., Milwaukee.
- Souther Iron Co., E. E., St. Louis.
- Steel Products Engineering Co., Springfield, O.
- Stewart-Rogers, Inc., Philadelphia (Anthracite).
- Stok-A-Fire Co., Inc., University City, Mo.
- Stokerette Mfg. Co., Chicago.
- Stoker-Lad Co., Tacoma, Wash.
- Stoker Products, Inc., Decatur, Ill.
- Sun-Fire Stoker Corp., New Albany, Ind.
- Tropic-Air Stoker Co., Canton, O.
- U. S. Machine Corporation, Lebanon, Ind.
- Wayne Oil Burner Co., Fort Wayne, Ind.
- Whiting Stoker Sales Co., Chicago.
- Will-Burt Co., Orrville, O.

STOKERS, INDUSTRIAL AND COMMERCIAL

(61 lb. to 300 lb. per hr.)

- Advance Appliance Co., Inc., Peoria, Ill.
- American Coal Burner Co., Chicago, Ill.
- Anchor Stove & Range Co., New Albany, Ind.
- Auburn Burner Co., Auburn, Ind.
- Auburn Foundry, Inc., Stoker Div., Auburn, Ind.
- Babcock & Wilcox Co., New York City.
- Black Servant Stoker Co., St. Louis.
- Bros Boiler & Mfg. Co., Wm., Minneapolis.
- Brownell Co., Dayton, O.
- Burke Stoker & Mfg. Co., Chicago.
- Burnham Stoker Co., Vancouver, Wash.
- Butler Street Foundry & Iron Co., Chicago.
- Canton Stoker Corp., Canton, O.
- Carpenter Heating & Stoker Company, Cleveland.
- Catskill Metal Works, Inc., Catskill, N. Y.
- Central Rubber & Steel Corp., Findlay, O.
- Chicago Automatic Stoker Co., Inc., Chicago.
- Coal-O-Matic Stoker Co., Trucksville, Pa. (Anthracite).
- Conco Corporation, Mendota, Ill.
- Consolidated Industries, Inc., Lafayette, Ind.
- Cooper & Cooper, Inc., Pittsfield, Mass. (Anthracite).
- Cotta Transmission Corp., 2340 Eleventh St., Rockford, Ill.
- Crown Iron Works, Minneapolis.
- Detroit Stoker Co., Detroit and Monroe, Mich.
- Diamond Castings Co., Johnsonburg, Pa.
- Eddy Stoker Corp., Chicago.
- Electric Furnace-Man, Inc., Emmaus, Pa.
- Fairbanks, Morse & Co., Chicago.
- Firewood Machine Wks., Converse, Ind.
- Flynn & Emrich Co., Baltimore.
- Frederick Iron & Steel Co., Frederick, Md.
- Front Rank Furnace Co., Div. Liberty Foundry Co., St. Louis
- Fuel Savers, Inc., Harrisburg, Pa.
- Gehl Bros. Mfg. Co., West Bend, Wis.
- General Machine Co., Inc., Emmaus, Pa.
- General Machinery Co., Spokane, Wash.
- Grand Rapids Blow Pipe and Dust Arrester Co., Grand Rapids, Mich.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Hare Stoker Corp., Detroit.
- Heating Assurance, Spokane, Wash.
- Hemp & Co., Inc., Macomb, Ill.
- Heritage Coal & Stoker Co., Chicago.
- Hershey Machine & Foundry Co., Manheim, Pa.
- Holcomb & Hoke Mfg. Co., Indianapolis.
- Illinois Iron & Bolt Co., Chicago.
- International Engineering Wks., Inc., Framingham, Mass.
- Iron Fireman Mfg. Co., Cleveland.

• Advertisement in this issue. See Index to Advertisers, page 324.

- Jacobson Machine Works, Inc., A. E., Minneapolis.
- Klingston Products Corporation, Kokomo, Ind.
- Kol-Master Corp., Oregon, Ill.
- Leffel & Co., James, Springfield, O.
- Link-Belt Co., Chicago.
- Mallory Sales Co., Dolton, Ill.
- Mesker & Co., Geo. L., Evansville, Ind.
- Meyer Furnace Co., Peoria, Ill.
- Muncie Gear Works, Inc., Muncie, Ind.
- National Steam Pump Co., Upper Sandusky, O.
- Neemes Foundry Inc., Troy, N. Y.
- Northern Steel & Stoker Corp., Peoria, Ill.
- Ormsby-Osterman Co., St. Louis.
- Over-Spred Stoker Co., Chicago.
- Patterson Foundry & Machine Co., East Liverpool, O.
- Perfection Grate & Stoker Co., Springfield, Mass.
- Plymouth Industries, Inc., Plymouth, Ind.
- Pocahontas Fuel Co., Inc., Cleveland.
- Racine Stoker Mfg. Co., Racine, Wis.
- Rheem Manufacturing Co., Stokermatic Div., Salt Lake City.
- Riley Stoker Corp., Worcester, Mass.
- Rosedale Fdry. & Mach. Co., N. S., Pittsburgh.
- Rudy Furnace Co., Dowagiac, Mich.
- Schwab Safe Co., Lafayette, Ind.
- Schwitzer-Cummins Company, Indianapolis.
- Scott-Newcomb, Inc., St. Louis.
- Sinker-Davis Co., Indianapolis.
- Steel Products Engineering Co., Springfield, O.
- Stok-A-Fire Co., Inc., University City, Mo.
- Stoker Products, Inc., Decatur, Ill.
- Sun-Fire Stoker Corporation, New Albany, Ind.
- Taylor Engineering Co., Cincinnati.
- Tropic-Air Stoker Co., Canton, O.
- U. S. Machine Corporation, Lebanon, Ind.
- Wayne Oil Burner Co., Fort Wayne, Ind.
- Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
- Whiting Stoker Sales Co., Chicago.
- Whitty Company, Inc., Boston (Allston), (Bituminous).
- Will-Burt Co., Orrville, O.

STOVES

See Heaters

STRAINERS, CONDUCTOR

See Fittings and Accessories, Conductor

STRAPS, LEADER

See Fittings and Accessories, Conductor

SWITCHES, MAGNETIC

- Allis-Chalmers Mfg. Co., Milwaukee.
- Allen-Bradley Co., Milwaukee.
- Arrow-Hart & Hegeman Electric Co., Hartford, Conn.
- Automatic Switch Co., New York City.
- B/W Controller Corp., Birmingham, Mich.
- Barber-Colman Company, Rockford, Ill.
- Clark Controller Co., Cleveland.
- Cook Electric Co., Chicago.
- Cutler-Hammer, Inc., Milwaukee.
- Detroit Lubricator Co., Detroit.
- Dunn Inc., Struthers, Philadelphia.
- Electric Controller & Mfg. Co., Cleveland.
- General Controls Co., Glendale, Calif.
- General Electric Co., Schenectady, N. Y.
- Guardian Electric Mfg. Co., Chicago.
- H-B Instrument Co., Inc., Philadelphia.
- Hart Mfg. Co., Hartford, Conn. (Mercury Tube).
- Industrial Engineering Corp., Terre Haute, Ind.
- McDonnell & Miller, Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Monitor Controller Co., Baltimore.
- Palmer Electric Co., Chicago.
- Paragon Electric Co., Chicago.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corp., Milwaukee.
- Square D Co., Detroit.
- Tork Clock Co., Inc., Mt. Vernon, N. Y.
- Trumbull Electric Mfg. Co., Plainville, Conn.
- Ward Leonard Electric Co., Mt. Vernon, N. Y.
- Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
- White-Rodgers Electric Co., St. Louis.
- Zenith Electric Co., Chicago.

SWITCHES, MANUAL

- Allen-Bradley Co., Milwaukee.
- Arrow-Hart & Hegeman Electric Co., Hartford, Conn.
- B/W Controller Corp., Birmingham, Mich.
- Barber-Colman Co., Rockford, Ill.
- Cooper Co., Clark, Palmyra, N. J.
- Cutler-Hammer, Inc., Milwaukee.
- Dual Remote Control Co., Wayne, Mich.
- Durakool, Inc., Elkhart, Ind. (Mercury).
- Electric Controller & Mfg. Co., Cleveland, O.
- General Controls Co., Glendale, Calif.
- General Electric Co., Schenectady, N. Y.
- Industrial Engineering Corp., Terre Haute, Ind.
- Square D Co., Detroit.
- Trumbull Electric Mfg. Co., Plainville, Conn.
- Ward Leonard Electric Co., Mount Vernon, N. Y.
- Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

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SWITCHES, TIME

- Allen-Bradley Company, Milwaukee.
- Au-Temp-Co Corp., New York City.
- Automatic Temperature Control Co., Inc., Philadelphia.
- Barber-Colman Co., Rockford, Ill.
- Cooper Co., Clark, Palmyra, N. J.
- Cramer Company, Inc., R. W., Centerbrook, Conn.
- Detroit Lubricator Co., Detroit.
- Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
- General Electric Co., Schenectady, N. Y.
- Gleason-Avery, Inc., Auburn, N. Y.
- Healy Ruff Co., St. Paul, Minn.
- Industrial Engineering Corp., Terre Haute, Ind.
- International Register Co., Chicago.
- Landis & Gyr, Inc., New York City.
- Mercoild Corp., Chicago.
- Miller Heat-O-Meter Co., Milwaukee.
- Minneapolis-Honeywell Regular Co., Minneapolis.
- National Time & Signal Corp., Detroit.
- Paragon Electric Co., Chicago.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corp., Milwaukee.
- Photoswitch, Inc., Cambridge, Mass.
- Reliance Automatic Lighting Co., Racine, Wis.
- Reynolds Electric Co., Chicago.
- Rhodes, Inc., M. H., Hartford, Conn.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- Sangamo Electric Co., Springfield, Ill.
- Tork Clock Co., Inc., Mt. Vernon, N. Y.
- Ward Leonard Electric Co., Mt. Vernon, N. Y.
- Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
- White-Rodgers Electric Co., St. Louis.
- Zenith Electric Company, Chicago.

TEES, FURNACE PIPE

See Fittings and Accessories, Furnace Pipe

TEMPERATURE CONTROLS

See Thermostats

TEMPERATURE RECORDERS

See Recorders, Temperature

TIMING MACHINES

See Motors, Timing

TINNING

See Baths, Tinning

TINPLATE

See Sheets, Tin

TIPS, DAMPER

See Clips and Tips, Damper

THERMOMETERS, INDICATING

- Bacharach Industrial Instrument Co., Pittsburgh.
- Barclay, Inc., Robert, Chicago (Flue Gas).
- Bristol Co., Waterbury, Conn.
- Brown Instrument Co., Div. of Minneapolis-Honeywell Reg. Co., Philadelphia.
- Cooper Oven Thermometer Co., Pequabuck, Conn.
- Defender Instrument & Regulator Co., St. Louis.
- Dickson Co., Chicago.
- Fee & Stemwedel, Inc., Chicago.
- Foxboro Co., Foxboro, Mass.
- G. M. Mfg. Co., New York City.
- H-B Instrument Co., Inc., Philadelphia.
- Hill, E. Vernon, Chicago.
- Illinois Testing Laboratories, Inc., Chicago.
- Leeds & Northrup Co., Philadelphia.
- Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
- Marsh Corporation, Jas. P., Chicago.
- Mason-Nellan Regulator Co., Chicago. (Dial)
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Moeller Instrument Co., Richmond Hill, N. Y.
- Palmer Co., Cincinnati.
- Powers Regulator Company, Chicago (Dial).
- Precision Thermometer & Instrument Co., Philadelphia.
- Preferred Utilities Mfg. Corp., New York City.
- Rochester Mfg. Co., Rochester, N. Y. (Dial).
- Sarco Company, Inc., New York City.
- Scientific Instrument Co., Detroit.
- Standard Thermometer, Inc., Boston.
- Tagliabue Mfg. Co., C. J., Brooklyn.
- Taylor Instrument Companies, Rochester, N. Y.
- Trerice Co., H. O., Detroit.
- United States Gauge Co., New York City.
- Wekslar Thermometer Corp., New York City.
- Weston Electrical Instrument Corp., Newark, N. J.
- Wheelco Instruments Co., Chicago.

THERMOSTATS, DAY AND NIGHT, CLOCK

- Au-Temp-Co Corp., New York City.
- Barber-Colman Company, Rockford, Ill.
- Detroit Lubricator Co., Detroit.
- General Controls Co., Glendale, Calif.
- General Electric Co., Bloomfield, N. J.
- Mercoild Corporation, Chicago.
- Minneapolis-Honeywell Regular Co., Minneapolis, Minn.
- Penn Electric Switch Co., Goshen, Ind.

- Perfex Corp., Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- Sarcotherm Controls, Inc., Chicago.
- Schwab Safe Co., Lafayette, Ind.
- Tork Clock Co., Inc., Mt. Vernon, N. Y.
- White Manufacturing Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis.

THERMOSTATS, HEAT ACCELERATED OR ANTICIPATING

- Au-Temp-Co Corp., New York City.
- Barber-Colman Company, Rockford, Ill.
- Cook Electric Co., Chicago.
- Detroit Lubricator Co., Detroit.
- Friez Instrument Division, Towson, Md.
- Fulton Syphon Co., Knoxville, Tenn.
- General Controls Co., Glendale, Calif.
- General Electric Co., Bloomfield, N. J.
- H-B Instrument Co., Inc., Philadelphia, Pa.
- Merco Corporation, Chicago.
- Minneapolis-Honeywell Regular Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corp., Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Precision Thermometer and Instrument Co., Philadelphia.
- Sarcotherm Controls, Inc., Chicago.
- Schwab Safe Co., Lafayette, Ind.
- Spencer Thermostat Co., Attleboro, Mass.
- Tagliabue Mfg. Co., C. J., Brooklyn.
- Thrush & Co., H. A., Peru, Ind.
- White-Rodgers Electric Co., St. Louis.

THERMOSTATS, LINE VOLTAGE

- American Instrument Co., Silver Spring, Md.
- Au-Temp-Co Corp., New York City.
- Automatic Products Co., Milwaukee.
- Barber-Colman Company, Rockford, Ill.
- Detroit Lubricator Co., Detroit.
- Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
- Friez Instrument Division, Towson, Md.
- General Controls Co., Glendale, Calif.
- General Electric Co., Bloomfield, N. J.
- H-B Instrument Co., Inc., Philadelphia.
- Merco Corporation, Chicago.
- Minneapolis-Honeywell Regular Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corp., Milwaukee.
- Ranco Inc., Columbus, O.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- Sarco Company, Inc., New York City.
- Sarcotherm Controls, Inc., Chicago.
- Schwab Safe Co., Lafayette, Ind.
- Spencer Thermostat Co., Attleboro, Mass.
- Thrush & Co., H. A., Peru, Ind.
- United Electric Controls Co., South Boston, Mass.
- White-Rodgers Electric Co., St. Louis.

THERMOSTATS, LOW VOLTAGE

- American Instrument Co., Silver Spring, Md.
- Au-Temp-Co Corp., New York City.
- Automatic Products Co., Milwaukee.
- Barber-Colman Company, Rockford, Ill.
- Cook Electric Co., Chicago, Ill.
- Crise Electric Mfg. Co., Columbus, O.
- Detroit Lubricator Co., Detroit.
- Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
- Friez Instrument Division, Towson, Md.
- General Controls Co., Glendale, Calif.
- General Electric Co., Bloomfield, N. J.
- Gleason-Avery, Inc., Auburn, N. Y.
- H-B Instrument Co., Inc., Philadelphia.
- McCorkle Co., D. H., Berkeley, Calif.
- Merco Corporation, Chicago.
- Minneapolis-Honeywell Regular Co., Minneapolis.
- Penn Electric Switch Co., Goshen, Ind.
- Perfex Corp., Milwaukee.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- Sarco Company, Inc., New York City.
- Schwab Safe Co., Lafayette, Ind.
- Spencer Thermostat Co., Attleboro, Mass.
- Thrush & Co., H. A., Peru, Ind.
- United Electric Controls Co., South Boston, Mass.
- White Manufacturing Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis.

THERMOSTATS, MODULATING OR PROPORTIONING

- Atlas Valve Company, Newark, N. J. (Air Operated).
- Au-Temp-Co Corp., New York City.
- Barber-Colman Company, Rockford, Ill.
- Defender Instrument & Regulator Co., St. Louis.
- H-B Instrument Co., Inc., Philadelphia.
- Johnson Service Company, Milwaukee.
- Minneapolis-Honeywell Regular Co., Minneapolis.
- Schwab Safe Co., Lafayette, Ind.
- Tagliabue Mfg. Co., C. J., Brooklyn.
- White Manufacturing Co., St. Paul, Minn.

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THROUGH WALL FLASHINGS

See Flashings, Through Wall

TIME SWITCHES

See Switches, Time

TIMERS, WELDING

- Electronic Products Co., Geneva, Ill.
- Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

TIMING MACHINES

See Machines, Timing, for Stoker Controls

TIMING MOTORS

See Motors, Timing

TINNING FLUXES

See Compounds, Tinning

TOGGLE BOLTS

See Bolts, Toggle

TOOLS, FIRING

- Adams Company, The, Dubuque, Ia. (Clinker Tongs, Rakes, Hoes, Pokers, Ash Removers for Stokers).
- Apfel & Company, Hamilton, O. (Pokers, Rakes, Lighters, Clinker Tongs).
- Farrell-Cheek Steel Company, Stoker Parts Div., Sandusky, O. (Clinker Tongs, Rakes, Hooks, Slice Bars, Pokers, Back-up Wrenches).
- Northwestern Stove Repair Co., Chicago.
- Roesch & Associates, Inc., Syracuse, N. Y.
- Stratton & Terstegge Co., Louisville, Ky. (Clinker Tongs).

TOOLS, METAL WORKERS'

- Allegheny-Ludlum Steel Corporation, Brackenridge, Pa.
- Barth Mfg. Co., Milldale, Conn.
- Berridge Shear Co., Sturgis, Mich. (Pipe Crimpers and Snips)
- C-B Tool Co., Lancaster, Pa. (Rivet Cutter).
- Champion Tool Co., Los Angeles (Pipe Crimper).
- Cherry Rivet Co., Los Angeles (Rivet Gun).
- Chicago Precision Equipment Co., Chicago, Ill.
- Circo Tool Co., Milwaukee. (Hole Cutters)
- Cleveland Pneumatic Tool Co., Chicago. (Cleco Sheet Holders)
- Crescent Tool Co., Jamestown, N. Y. (Scratch Awls, Pliers, Screw-drivers).
- Damascus Steel Products Corporation, Rockford, Ill. (Punches, Chisels, Star Drills, Nippers).
- Greenlee Tool Co., Rockford, Ill. (Pipe Benders, Chisels, Screw Drivers).
- Grobet File Corp. of America, New York City (Files).
- Haines Gauge Company, Inc., Philadelphia (Thickness Gauges).
- Hub Specialty Co., Somerville, Mass. (Awl).
- Interstate Sales Co., New York City (Angle Meters, Circle Meters, Divisor, Mechanic's Protractor).
- Jewel Mfg. Co., St. Paul, Minn. (Welding Clamps)
- Johnson Ladder & Shoe Co., Eau Claire, Wis. (Ladder Shoes).
- Mid-States Equipment Co., Chicago. (Power Saw)
- Millers Falls Co., Greenfield, Mass. (Hack Saws).
- Misener Mfg. Co., Inc., Syracuse, N. Y. (Rotary Hack Saw and Blades, and Hole Saw for Metal and Wood).
- Myers Ladder Equipment Company, Madison, Wis. (Ladder Brackets).
- Niagara Machine & Tool Works, Buffalo.
- Packham Crimper Co., Mechanicsburg, O. (Crimping Tongs).
- Peck, Stow & Wilcox Co., Southington, Conn.
- Penn Tool Co., Philadelphia (Punches, Chisels and Edge Tools).
- Phillips Drill Co., Chicago (Anchor Bolt Drill).
- Poe, Ralph W., Canton, Ill. (Sheet Metal Cutters).
- Reimuller Bros. Co., Franklin Park, Ill. (Hydraulic Vises)
- Reiner & Campbell Co., Inc., Elizabeth, N. J. (Dividers).
- Scherr Co., Inc., George, New York City. (Micrometers)
- Skillsaw, Inc., Chicago (Blowers and Suction Cleaners).
- Snap-On Tools Corp., Kenosha, Wis. (Hammers, Screw Drivers, Chisels, Punches, Soldering Irons and Pliers, Hack Saws, Drills, Files, Bolt Cutters, Metal Shears, Tin Snips, Vises, Grinders)
- Stanley Tools, New Britain, Conn. (Punches, Rules) Cold Chisels, Levels, Bit Braces, Squares, Screwdrivers, Bars)
- Star Electric Motor Co., Bloomfield, N. J. (Drill Sharpener).
- Vulcan Electric Co., Danvers, Mass. (Electric Soldering Irons, Solder Pots, Glue Pots).
- Topflight Tool Co., Towson, Md. (Jigs)
- Whitney Mfg. Co., W. A., Rockford, Ill.
- Whitney Metal Tool Co., Rockford, Ill. (Aircraft Rivet Squeezer).
- Wodack Electric Tool Corp., Chicago. (Groover)

TOOLS, ROOFERS'

- Adams Company, Dubuque, Ia. (Scaffold Brackets).
- Aeroll Burner Co., Inc., West New York, N. J. (Melting Kettles, Hoists, Buckets, Tools and Accessories).
- Ajax Building Bracket Co., Cleveland Heights, O. (Brackets).
- All States Roofers Equip. & Mat'l Co., Chicago (Complete Line).
- Belden Machine Company, New Haven, Conn. (Hammer, Ripper, Stake & Punch).
- Conner Construction Co., Philadelphia. (Kettles)
- Eastern States Supply Co., Brooklyn (Mops, Hoist Wheel, Buckets, Dippers, Slaters' Tools, Tin Discs).
- Eiermann Floor Scraper Co., York, Pa. (Roof Scrapers)

- Frey & Co., Frank P., Chicago.
- Hauck Manufacturing Co., Brooklyn (Asphalt and Pitch Kettles).
- Littleford Bros., Inc., Cincinnati.
- Milcor Steel Co., Milwaukee.
- Mohawk Asphalt Heater Co., Frankfort, N. Y. (Kettles)
- Peck, Stow & Wilcox Co., Southington, Conn.
- Southbridge Roofing Company, Inc., Southbridge, Mass. (Scrapers, gravel spreaders, tanners' firepots, buckets, kettles).
- Structural Slate Co., Pen Argyl, Pa. (Hammer, Ripper and Stake, also Portable Machine Cutter and Punch).

TOPS, CHIMNEY

See Caps and Tops, Chimney

TORCHES, BRAZING, CUTTING, WELDING, ELECTRIC

- Borm Manufacturing Company, Elgin, Ill.
- General Scientific Equipment Co., Philadelphia.
- Hammett Electric Mfg. Co., Kansas City, Mo.
- Marquette Mfg. Co., Inc., Minneapolis.
- Mid-States Equipment Co., Chicago.
- National Cylinder Gas Co., Chicago.
- Will-Weld Manufacturing Co., Omaha, Nebr.

TORCHES, BRAZING, CUTTING, WELDING, OXY-ACETYLENE

- Aeroll Burner Co., Inc., West New York, N. J.
- Air Reduction Sales Co., New York City.
- Atkins and Company, Inc., E. C., Indianapolis.
- Bastian-Blessing Co., Chicago.
- Bernz Co., Otto, Rochester, N. Y. (Brazing).
- Burdett Mfg. Co., Chicago.
- Clayton & Lambert Mfg. Co., Dearborn, Mich.
- Dockson Corporation, Detroit.
- Eclipse Fuel Engineering Co., Rockford, Ill.
- Ergolyte Manufacturing Co., Philadelphia.
- General Scientific Equipment Co., Philadelphia.
- Harris Calorific Co., Cleveland.
- Imperial Brass Mfg. Co., Chicago.
- Linde Air Products Co., The, New York City.
- Lonn Mfg. Co., Inc., Chicago.
- Marquette Manufacturing Co., Inc., Minneapolis.
- Milburn Co., Alexander, Baltimore.
- Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
- Modern Engineering Co., St. Louis.
- National Cylinder Gas Co., Chicago.
- Reiner & Campbell Co., Inc., Elizabeth, N. J.
- Smith Welding Equipment Corp., Minneapolis, Minn.
- Torch Weld Equipment Div., National Cylinder Gas Co., Chicago.
- Trindl Products, Ltd., Chicago.
- Victor Equipment Company, San Francisco.
- Wall Chemical Div., Liquid Carbonic Corp., Chicago.
- Welding Apparatus Co., Chicago.

TORCHES, SOLDERING

- Bastian-Blessing Co., Chicago.
- Berns Co., Otto, Rochester, N. Y.
- Choate Mfg. Co., Cincinnati.
- Clayton & Lambert Mfg. Co., Dearborn, Mich.
- Detroit Torch & Mfg. Co., Detroit.
- Diener Mfg. Co., Geo. W., Chicago.
- Eclipse Fuel Engineering Co., Rockford, Ill.
- Ergolyte Manufacturing Co., Philadelphia.
- Everhot Mfg. Co., Maywood, Ill.
- Harris Calorific Co., Cleveland.
- Ideal Commutator Dresser Co., Sycamore, Ill.
- Imperial Brass Mfg. Co., Chicago.
- Insto-Gas Corporation, Detroit.
- Johnson Gas Appliance Co., Cedar Rapids, Ia.
- Lenk Mfg. Company, Newton Lower Falls, Mass.
- Linde Air Products Co., The, New York City.
- Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
- Modern Engineering Co., St. Louis.
- National Cylinder Gas Co., Chicago.
- National Safety Device Co., Chicago.
- Reiner & Campbell Co., Inc., Elizabeth, N. J.
- Reliable Gas Products Co., Cedar Rapids, Ia.
- Sanders, J. A., Fulton, N. Y.
- Sight Feed Generator Co., Richmond, Ind.
- Smith Welding Equipment Corp., Minneapolis, Minn.
- Torch Weld Equipment Div., National Cylinder Gas Co., Chicago.
- Torit Manufacturing Co., St. Paul, Minn.
- Turner Brass Works, Sycamore, Ill.
- Unique Manufacturing Co., Inc., Chicago (Gasoline).
- Wall Chemicals Div., Liquid Carbonic Corp., Chicago.
- Wall Mfg. Supply Co., P., N. S. Pittsburgh.
- Welding Apparatus Co., Chicago.

TRANSFORMERS, IGNITION

- Davis & Co., Inc., Dean W., Chicago.
- General Electric Co., Schenectady, N. Y.
- Harvey, Inc., Sid, Valley Stream, N. Y.
- Jefferson Electric Company, Bellwood, Ill.
- Webster Electric Co., Racine, Wis.

TRANSFORMERS, LOW VOLTAGE

- Barber-Colman Co., Rockford, Ill.

- Canatsey Electric Manufacturing Co., Kansas City, Mo.
- Cook Electric Co., Chicago.
- Davis & Co., Inc., Dean W., Chicago.
- Detroit Lubricator Co., Detroit.
- Friez Instrument Division, Towson, Md.
- General Controls Co., Glendale, Calif.
- General Electric Co., Schenectady, N. Y.
- Hercules Electric & Mfg. Co., Inc., Brooklyn.
- Ideal Commutator Dresser Co., Sycamore, Ill.
- Jefferson Electric Co., Bellwood, Ill.
- Mercoid Corporation, Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
- Taylor-Winfield Corp., Warren, O.
- Wagner Electric Corp., St. Louis.
- Webster Electric Co., Racine, Wis.
- Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

TRANSMISSIONS, VARIABLE SPEED

- Lewellen Mfg. Co., Columbus, Ind.

TRIM, ORNAMENTAL

See Moulding and Trim, Ornamental

TUBING, ALUMINUM

- Aluminum Company of America, Pittsburgh.
- Brasco Mfg. Co., Harvey, Ill.
- Lewin-Mathes, Lewin Metals Div., St. Louis.
- Revere Copper & Brass, Inc., New York City.
- Wolverine Tube Div. of Calumet & Hecla Consolidated Copper Co., Detroit.

TUBING, COPPER

- Allegheny-Ludlum Steel Corporation, Brackenridge, Pa. (Stainless)
- American Brass Co., Waterbury, Conn.
- Brasco Mfg. Co., Harvey, Ill.
- Bridgeport Brass Co., Bridgeport, Conn.
- Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
- Conklin Brass & Copper Co., Inc., T. E., New York City.
- Downs-Smith Brass & Copper Co., Inc., New York City.
- Hussey & Co., C. G., Pittsburgh.
- Imperial Brass Mfg. Co., Chicago.
- International Nickel Co., New York City. (Nickel, Monel, Inconel)
- Lewin-Mathes Company, Lewin Metals Div., St. Louis.
- Mueller Brass Co., Port Huron, Mich.
- Phelps Dodge Copper Products Corp., British American Tube Div., New York City.
- Revere Copper & Brass Incorporated, New York City.
- Roberts Tube Works, Detroit.
- Wolverine Tube Div., Calumet and Hecla Consolidated Copper Company, Detroit.

TUBING AND FITTINGS, PLASTIC

- Acadia Synthetic Products Division, Chicago.
- Carter Products Corp., Cleveland.
- Colonial Alloys Co., Philadelphia.
- Commercial Plastics Co., Chicago.
- Extruded Plastics, Inc., Norwalk, Conn.
- Firestone Tire & Rubber Co., Akron, O.
- General Electric Co., Plastics Div., 1 Plastics Ave., Pittsfield, Mass.
- Goodrich Co., B. F., Akron, O.
- Hodgman Rubber Co., Framingham, Mass.
- Irvington Varnish and Insulator Co., Irvington, N. J.
- Mills Corp., Elmer E., Chicago.
- North Penn Co., New York City.
- Parker Appliance Co., Cleveland.
- Resistoflex Corp., Belleville, N. J. (Synthetic)
- Sandee Mfg. Co., Chicago.
- Skuttie Manufacturing Co., Detroit.
- United States Stoneware Co., Akron, O., and New York City.
- Werner Co., Inc., R. D., New York City.
- Yardley Plastics Company, Columbus, O.

UNITS, AIR CONDITIONING

See Air Conditioning Units

UNITS, FUEL FOR OIL BURNERS

- Kraissl Company, Inc., Hackensack, N. J.
- Monarch Manufacturing Works, Inc., Philadelphia.
- Sundstrand Pump Division, Rockford, Ill.
- Webster Electric Co., Racine, Wis.

UNITS, WINDOW VENTILATOR AND FILTER

- Airgard Manufacturing Co., Chicago.
- American Air Conditioning Co., Detroit.
- Automatic Ventilator Company, Corunna, Mich.
- Berger Mfg. Div., Republic Steel Corp., Canton, O.
- Ilg Electric Ventilating Co., Chicago.
- Kaiser Co., H. S., Chicago.
- Kauffman Air Conditioning Corp., St. Louis.
- Meter Electric & Machine Co., Indianapolis, Ind.
- Mellish & Murray Co., Chicago.
- Reed Unit-Fans, Inc., New Orleans.

• Advertisement in this issue. See Index to Advertisers, page 324.

Reliable Sheet Metal Engineering Co., Chicago.
Somers, Inc., H. J., Detroit.
Trade-Wind Motor Fans, Inc., Los Angeles.
Unified Air Conditioner Co., Duluth, Minn.
• Utility Appliance Corporation, Los Angeles.
Vita-Screen Ventilator Co., New York City.

VACUUM CLEANERS FOR FURNACES

See Cleaners, Vacuum, Furnace

VALVES, GAS PRESSURE REGULATING

- Atlas Valve Co., Newark.
- Barber Gas Burner Co., Cleveland.
- Belfield Co., H., Philadelphia.
- Bryant Corp., C. L., Cleveland.
- Cooper Co., Clark, Palmyra, N. J.
- Davis Regulator Co., Chicago.
- Defender Instrument & Regulator Co., St. Louis. (Chronometer)
- Eclipse Fuel Engineering Co., Rockford, Ill.
- Fisher Governor Co., Marshalltown, Ia.
- Fox Control & Mfg. Co., Cleveland.
- Fulton Sylphon Co., Knoxville, Tenn.
- General Controls Co., Glendale, Calif.
- Golden-Anderson Valve Specialty Co., Pittsburgh.
- Hotstream Heater Co., Cleveland.
- Kieley & Mueller, Inc., North Bergen, N. J.
- Klipfel Mfg. Co., Chicago.
- Mason-Neelan Regulator Co., Dorchester, Mass.
- Mercoid Corp., Chicago.
- Milwaukee Gas Specialty Company, Milwaukee.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Mueller Co., Decatur, Ill.
- Norgren Co., C. A., Denver, Colo.
- Payne Furnace & Supply Co., Beverly Hills, Calif.
- Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
- Roberts-Gordon Appliance Corp., Buffalo.
- Tagliabue Mfg. Co., C. J., Brooklyn.
- Trerice Co., H. O., Detroit.

VALVES, HUMIDIFIER, WATER LEVEL

- Badger Corporation, Milwaukee.
- Barclay, Inc., Robert, Chicago.
- Belfield Co., H., Philadelphia.
- Cleveland Humidifier Co., Cleveland.
- Fisher Governor Co., Marshalltown, Ia.
- G. & S. Tool Co., Detroit.
- General Controls Co., Glendale, Calif.
- Golden-Anderson Valve Specialty Co., Pittsburgh.
- Mald-O'-Mist, Inc., Chicago.
- McAlear Mfg. Co., Chicago.
- McDonnell & Miller, Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Scovill Mfg. Co., Morency-Van Buren Div., Sturgis, Mich.
- Skuttile Manufacturing Co., Detroit.
- Viking Air Conditioning Corp., Cleveland.

VALVES, SOLENOID

- Albright Equipment Co., Johnstown, Pa.
- Alco Valve Co., St. Louis.
- Au-Temp-Co Corp., New York City.
- Automatic Products Co., Milwaukee.
- Automatic Switch Co., New York City.
- Barber-Colman Co., Rockford, Ill.
- Belfield Co., H., Philadelphia.
- Cooper Co., Clark, Palmyra, N. J.
- Cutler-Hammer, Inc., Milwaukee.
- Davis Regulator Co., Chicago.
- Detroit Lubricator Co., Detroit.
- Electric Valve Mfg. Co., Inc., New York City.
- Electromatic Division, The Simoniz Co., Chicago.
- Frick Company, Waynesboro, Pa.
- General Controls Co., Glendale, Calif. (Magnetic)
- General Electric Co., Schenectady, N. Y.
- General Sales & Products Co., Cohoes, N. Y.
- Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
- Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
- Hubbell Corp., Chicago.
- Hunt & Son, C. B., Salem, O.
- Keckley Co., O. C., Chicago, Ill.
- Lonergan Mfg. Co., Albion, Mich.
- McDonnell & Miller, Chicago.
- Mercoid Corp., Chicago.
- Milwaukee Gas Specialty Company, Milwaukee.
- Minneapolis-Honeywell Regulator Co., Minneapolis.
- Parker Appliance Co., Cleveland.
- Payne Furnace & Supply Co., Inc., Beverly Hills, Calif.
- Penn Electric Switch Co., Goshen, Ind.
- Pfening Co., Fred D., Columbus, O.
- R-S Products Corporation, Philadelphia.
- Ruggles-Klingemann Mfg. Co., Salem, Mass.
- Sarco Co., Inc., New York City.
- Sarcotherm Controls, Inc., Chicago.
- Sporlan Valve Co., St. Louis.
- Square D Company, Detroit.
- Supreme Electric Products Corp., Rochester, N. Y.
- Vapor Car Heating Co., Inc., Chicago.
- Wheelco Instruments Co., Chicago.
- White-Rodgers Electric Co., St. Louis.

VANES, DUCT TURNING, PREFABRICATED

- Air Devices, Inc., New York City.
- Barber-Colman Company, Rockford, Ill.
- Stewart Manufacturing Co., Bloomfield, N. J. (Outlet Scoops)
- Tuttle & Bailey, Inc., New Britain, Conn.
- Waterloo Register Company, Waterloo, Ia.

VENETIAN BLINDS

See Blinds, Venetian

VENTILATORS, BLACKOUT

- Air Conditioning Products Co., Detroit.
- Carrier Corporation, Syracuse, N. Y.
- Chelsea Fan & Blower Co., Inc., Irvington, N. J.
- DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
- Jordan & Co., Inc., Paul R., Indianapolis, Ind.
- Young Radiator Co., Racine, Wis.

VENTILATORS, CEILING

- Airmaster Corp., Chicago.
- Auer Register Co., Cleveland.
- Barber-Colman Company, Rockford, Ill.
- Best Register Co., Milwaukee.
- Chelsea Fan & Blower Co., Inc., Irvington, N. J.
- Decatur Iron & Steel Co., Decatur, Ala.
- Elgo Shutter & Manufacturing Co., Detroit.
- Gillman Mfg. Co., Detroit.
- Hart & Cooley Mfg. Co., Holland, Mich.
- Klauser Manufacturing Co., Dubuque, Ia.
- Lamneck Products Co., Middletown, O.
- Milcor Steel Co., Milwaukee.
- Miller & Doing, Brooklyn.
- Tuttle & Bailey, Inc., New Britain, Conn.
- United States Register Co., Battle Creek, Mich.
- Universal Blower Co., Birmingham, Mich.

VENTILATORS, MUSHROOM

- Aeolus Dickinson, Chicago.
- Best Register Co., Milwaukee.
- DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
- Knowles Mushroom Ventilator Co., Montclair, N. J.
- Lumm Co., A. H., Toledo, O.
- Mueller Furnace Co., L. J., Milwaukee.
- Penn Ventilating Co., Philadelphia.
- Peters-Dalton, Inc., Detroit.
- Tuttle & Bailey, Inc., New Britain, Conn.
- Ventilating Products Co., Chicago.

VENTILATORS, ROOF, FAN

- Aeolus Dickinson, Chicago.
- Aerovent Fan Co., Piqua, O.
- Air Conditioning Products Co., Detroit.
- Air Controls, Inc., Cleveland.
- Airmaster Corp., Chicago.
- Allen Corp., Detroit. (Turbine)
- American Blower Corporation, Detroit.
- American Coolair Corp., Jacksonville, Fla.
- American-Larson Ventilating Co., Pittsburgh.
- American Steel Band Co., Pittsburgh.
- Arex Co., Chicago.
- Belanger Fan & Blower Co., Detroit.
- Bishop & Babcock Mfg. Co., Cleveland.
- Breidert Co., G. C., Los Angeles.
- Burt Mfg. Co., Akron, O.
- Century Fan & Ventilating Co., New York City. (Turbine)
- Chelsea Fan & Blower Co., Inc., Irvington, N. J.
- Clay Equipment Corp., Cedar Falls, Ia.
- Davidson Hy Duty Roof Fan Co., Newton, Mass.
- DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
- Diehl Mfg. Company, Somerville, N. J.
- Dual-Air Fan Corporation, Chicago.
- Economy Electric Mfg. Co., Cicero, Ill.
- Electrovent Fan & Mfg. Co., Chicago.
- Empire Ventilation Equipment Co., Long Island City, N. Y.
- Fingles Co., The, Baltimore, Md.
- Gallaher Company, Owatonna, Minn. (Centrifugal)
- Gehrl Company, Tacoma, Wash.
- Grand Rapids Blow Pipe and Dust Arrester Co., Grand Rapids, Mich.
- Hartzell Propeller Fan Co., Piqua, O.
- Hirschman Co., Inc., W. F., Buffalo.
- Howes-Woods Company, Cambridge, Mass.
- Hunter Fan & Ventilating Co., Memphis, Tenn.
- Ilg Electric Ventilating Co., Chicago.
- International Engineering, Inc., Dayton, O.
- Iona Ventilator Co., Inc., Philadelphia.
- Johnson Fan & Blower Corp., Chicago.
- Jordan & Co., Paul R., Indianapolis.
- Kernchen Co., Chicago.
- King Ventilating Co., Owatonna, Minn.
- Klauser Manufacturing Co., Dubuque, Ia.
- Klee Co., George B., Cincinnati.
- Lee & Son Co., Thomas, Cincinnati, O.

• Advertisement in this issue. See Index to Advertisers, page 324.

- Lumm Co., A. H., Toledo, O.
- Martin Fan & Blower Co., Chicago.
- Mellish & Murray Co., Chicago.
- Mountain States Equipment Co., Denver, Colo.
- Myers Electric Co., Pittsburgh.
- National Metal Fabricators, Chicago.
- Nelson Corporation, Herman, Moline, Ill.
- New York Blower Co., Chicago.
- Pennsylvania Wire Glass Co., Philadelphia.
- Peerless Electric Co., Warren, O.
- Penn Ventilating Co., Philadelphia.
- Peters-Dalton, Inc., Detroit.
- Phoenix Ventilator Co., Brooklyn, N. Y.
- Powermatic Ventilator Co., Cleveland.
- Propellair, Inc., Springfield, O.
- Reed Unit-Fans, Inc., New Orleans.
- Robertson Co., H. H., Pittsburgh. (Round-Rectangular)
- Royal Ventilator Co., Philadelphia.
- Schwitzer-Cummins Company, Indianapolis.
- Shreveport Engineering Co., Inc., Shreveport, La.
- Somers, Inc., H. J., Detroit.
- Sturtevant Co., B. F., Hyde Park, Boston.
- Swartwout Co., Cleveland.
- Trade-Wind Motor Fans, Inc., Los Angeles.
- Trane Company, LaCrosse, Wis.
- Trullo Fan Co., Harmony, Pa.
- Uno Ventilator Co., Cliftondale, Mass. (Turbine)
- Utility Appliance Corporation, Los Angeles.
- Van Noorden Company, E., Boston.
- Viking Air Conditioning Corp., Cleveland.
- Washburne & Co., E. G., New York City.
- Waverly Heating Supply Co., Boston.
- Western Engineering & Mfg. Co., Los Angeles.
- Wind-Way Fan & Ventilator Co., Inc., New Orleans.
- Wing Mfg. Co., L. J., New York City.
- Winkler & Sons, Inc., A. E., Milwaukee.
- Young Radiator Company, Racine, Wis.

VENTILATORS, ROOF, GRAVITY

- Accurate Mfg. Works, Chicago.
- Air Devices, Inc., New York City.
- A-J Manufacturing Co., Kansas City.
- Aeolus Dickinson, Chicago.
- Air Control Products, Inc., Coopersville, Mich.
- Allen Corp., Detroit. (Turbine)
- American-Larson Ventilating Co., Pittsburgh.
- American Metal Products, Fort Worth, Tex.
- American Sheet Metal Works, New Orleans.
- American Steel Band Co., Pittsburgh.
- Ames Co., W. R., San Francisco.
- Arex Co., Chicago.
- Autoforce Ventilating System, Boston.
- Berger Bros. Co., Philadelphia.
- Breidert Co., G. C., Los Angeles.
- Burt Mfg. Co., Akron, O.
- Century Fan & Ventilator Co., New York City.
- Cincinnati Sheet Metal & Roofing Co., Cincinnati.
- Clay Equipment Corp., Cedar Falls, Ia.
- Danzer Metal Works Co., Hagerstown, Md.
- Day Co., The, Minneapolis.
- Edwards Mfg. Co., Inc., Cincinnati.
- Empire Ventilation Equipment Co., Long Island City, N. Y.
- Fingles Co., The, Baltimore, Md.
- Gehrl Company, Tacoma, Wash.
- Grand Rapids Blow Pipe and Dust Arrester Co., Grand Rapids, Mich.
- Hirschman Co., Inc., W. F., Buffalo.
- Howes-Woods Company, Cambridge, Mass.
- International Steel Co., Evansville, Ind.
- Iona Ventilator Co., Inc., Philadelphia.
- Iwan Brothers, South Bend, Ind.
- Jamar Co., Walker, Duluth, Minn.
- Jordan & Co., Paul R., Indianapolis.
- Kernchen Co., Chicago.
- King Ventilating Co., Owatonna, Minn.
- Klauser Manufacturing Co., Dubuque, Ia.
- Kleenaire Corp., Stevens Point, Wis.
- LaCrosse Steel Roofing & Corrugating Co., LaCrosse, Wis.
- Lamneck Products, Inc., Middletown, O.
- Lee & Son Co., Thomas, Cincinnati.
- Leslie Welding Co., Chicago. (Slant Roof Louver)
- Levow, David, New York City.
- Lumm Co., A. H., Toledo, O.
- Lyon, Conklin & Co., Inc., Baltimore, Md.
- Mellish & Murray Co., Chicago.
- Merchant & Evans Co., Philadelphia.
- Milcor Steel Co., Milwaukee.
- Moeschl-Edwards Corrugating Co., Inc., Cincinnati.
- Osborn Co., J. M. & L. A., Cleveland.
- Patten Co., J. V., Sycamore, Ill.
- Penn Ventilating Co., Philadelphia.
- Pennsylvania Wire Glass Co., Philadelphia.
- Peters-Dalton, Inc., Detroit.
- Phoenix Ventilator Co., Brooklyn, N. Y.
- Pioneer Roofing & Sheet Metal Co., Muskogee, Okla.
- Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
- Riggin Metal Products, Inc., Kankakee, Ill.
- Robertson Co., H. H., Pittsburgh. (Monitor)
- Royal Ventilator Co., Philadelphia.
- Ryniker Steel Products Company, Billings, Mont.

- St. Paul Corrugating Co., St. Paul, Minn.
- Sheet Metal Mfg. Co., Inc., Brooklyn.
- Sioux Steel Co., Sioux Falls, S. D.
- Southbridge Roofing Co., Inc., Southbridge, Mass.
- Souther Iron Co., E. E., St. Louis.
- Southern States Iron Roofing Co., Savannah, Ga.
- Standard Furnace & Supply Company, Omaha, Nebr.
- Standard Ventilator Co., Lewisburg, Pa. (Rotary)
- Steinhorst & Sons, Inc., Emil, Utica, N. Y.
- Swartwout Co., Cleveland.
- Tierney Rotor Ventilator Co., Minneapolis.
- Tiffin Eaves Trough Clamp Co., Tiffin, O.
- Uno Ventilator Co., Cliftondale, Mass. (Turbine)
- Van Noorden Company, E., Boston.
- Western Engineering & Mfg. Co., Los Angeles.
- Willis Steel Corporation, Galesburg, Ill.
- Winkler & Sons, Inc., A. E., Milwaukee.
- York Corrugating Co., York, Pa.

VENTILATORS, ROOF, RIDGE

- Accurate Mfg. Works, Chicago.
- Aeolus Dickinson, Chicago.
- American-Larson Ventilating Co., Pittsburgh.
- Arex Co., Chicago.
- Burt Mfg. Co., Akron, O.
- Century Fan & Ventilator Co., New York City.
- Gehrl Company, Tacoma, Wash.
- Hirschman Co., Inc., W. F., Buffalo, N. Y.
- Klauser Manufacturing Co., Dubuque, Ia.
- Pennsylvania Wire Glass Co., Philadelphia.
- Penn Ventilating Co., Philadelphia.
- Robertson Company, H. H., Pittsburgh.
- Royal Ventilator Co., Philadelphia.
- Souther Iron Co., E. E., St. Louis.
- Swartwout Co., Cleveland.
- Van Noorden Company, E., Boston.

VIBRATION ISOLATORS

See Bases and Pads

WARM AIR REGISTER SHIELDS

See Shields, Warm Air Register

WASHERS, AIR, HEATING AND VENTILATING

(Capacity 4,000 c.f.m. and up)

- Air & Refrigeration Corp., New York City.
- Airwasher Corporation, Lansing, Mich.
- American Blower Corp., Detroit.
- Ames Co., W. R., San Francisco.
- Ballantyne Co., Omaha, Nebr.
- Bayley Blower Co., Milwaukee.
- Bishop & Babcock Mfg. Co., Cleveland.
- Blower Application Co., Milwaukee.
- Buffalo Forge Co., Buffalo.
- Centri-Spray Co., Detroit.
- Clarage Fan Co., Kalamazoo, Mich.
- Columbus Heating & Ventilating Co., Columbus, O.
- Drying Systems, Inc., Chicago.
- Electrovent Fan & Mfg. Co., Chicago.
- International Sales Co., San Francisco.
- Mellish & Murray Co., Chicago.
- Mountain States Equipment Co., Denver, Colo.
- Murray Manufacturing Co., D. J., Wausau, Wis.
- New York Blower Co., Chicago.
- Northern Blower Co., Cleveland.
- Parks-Cramer Co., Fitchburg, Mass.
- Peters-Dalton, Inc., Detroit.
- Phillips Cooling Tower Co., Inc., New York City.
- Ross Sprinkler Co., Pasadena, Calif.
- Schmieg Industries, Detroit.
- Spray Engineering Co., Somerville, Mass.
- Strandwitz & Co., Inc., W. J., Camden, N. J.
- Sturtevant Co., B. F., Hyde Park, Boston.
- Trane Co., La Crosse, Wis.
- U. S. Air Conditioning Corp., Minneapolis.
- Utility Appliance Corporation, Los Angeles.
- Vilter Mfg. Company, Milwaukee.
- Western Blower Co., Seattle, Wash.
- York Corp., York, Pa.

WATERPROOFING

- Angier Corporation, Framingham, Mass.
- Barrett Division, Allied Chemical & Die Corporation, New York City.
- Cabot, Inc., Samuel, Boston.
- Carey Mfg. Co., Philip, Lockland, O.
- Cheesman-Elliott Co., Inc., Brooklyn, N. Y.
- Eastern States Supply Co., Brooklyn.
- Flintkote Co., New York City.
- General Insulating Products Co., Brooklyn.
- Glidden Company, Cleveland.
- Horn Co., A. C., Long Island City, N. Y.
- Johns-Manville Sales Corp., New York City.
- Koppers Company, Inc., Pittsburgh.
- Lehon Company, Chicago.
- Nebel Manufacturing Co., Cleveland.
- Primold Products Corp., New York City.
- Reilly Tar & Chemical Corporation, Indianapolis, Ind. (Compounds)
- Ruberoid Co., New York City.
- Sisalkraft Co., Chicago.

• Advertisement in this issue. See Index to Advertisers, page 324.

Sonneborn Sons, Inc., L., New York City.
Southport Paint Co., Savannah, Ga.
Toch Brothers, Inc., Elm Park, S. I., N. Y.
Truscon Laboratories, Detroit.
X-Pando Corporation, Long Island City, N. Y.

WATERPROOFING COMPOUNDS

See Compounds, Waterproofing

WATER HEATERS

See Coils, Fire Pot, Hot Water

WELDERS, ARC

Air Reduction Sales Company, New York City.
Allied Weld Crafts, Inc., Indianapolis.
Allis-Chalmers Manufacturing Company, Milwaukee.
Borm Manufacturing Company, Elgin, Ill.
Coddington Manufacturing Co., E. D., Milwaukee.
Eisler Engineering Co., Newark, N. J.
Electric Arc, Inc., Newark, N. J.
Ergolyte Mfg. Co., Philadelphia. (A.C.)
Fern, Ralph, Scranton, Pa.
General Equipment Co., Wichita, Kan.
General Electric Co., Schenectady, N. Y.
Hammett Electric Mfg. Co., Kansas City, Mo.
Hampton Electric Mfg. Co., Oakmont, Pa.
Harnischfeger Corp., Milwaukee. (Electric)
Hercules Electric & Mfg. Co., Inc., Brooklyn.
Hobart Brothers Co., Troy, O.
Hollup Corp., Div. National Cylinder Gas Co., Chicago.
Ideal Electric & Mfg. Co., Mansfield, O.
Lee Co., K. O., Aberdeen, S. D.
Lincoln Electric Co., Cleveland.
Maple Valley Mfg. Co., Mapleton, Ia.
Marquette Manufacturing Co., Inc., Minneapolis. (A. C.)
Mid-States Equipment Co., Chicago.
Miller Electric Mfg. Co., Inc., Appleton, Wis. (Portable)
National Cylinder Gas Co., Chicago.
Pier Equipment Mfg. Co., Benton Harbor, Mich.
Sight Feed Generator Co., Richmond, Ind.
Smith Welding Equipment Corp., Minneapolis.
Star Electric Motor Co., Bloomfield, N. J.
Trindl, Inc., Jos. H., Chicago.
Una Welding, Incorporated, Cleveland. (Automatic Shielded Arc Welding)
• Universal Power Corporation, Cleveland.
Welding Apparatus Co., Chicago.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Will-Weld Mfg. Co., Inc., Omaha, Nebr. (A. C.)
Wilson Welder & Metals Co., Inc., New York City.

WELDERS, SPOT

• Acme Electric Welder Co., Los Angeles.
Agnew Electric Co., Milford, Mich.
Alphit Spot Welding Co., New York City.
Coddington Manufacturing Co., E. D., Milwaukee.
Dyer Welder & Engineering Co., Kansas City, Mo.
Eisler Engineering Co., Newark, N. J.
Electric Arc, Inc., Newark, N. J.
Federal Machine & Welder Co., Warren, O.
Micro Products Co., Chicago.
Pier Equipment Manufacturing Co., Benton Harbor, Mich. (Foot operated and motor driven)
• Sclaky Bros., Chicago, Ill.
Taylor-Hall Welding Corp., Worcester, Mass.
Taylor-Winfield Corp., Warren, O. (Butt and Seam)
Thomson-Gibb Electric Welding Co., Lynn, Mass.
• Universal Power Corporation, Cleveland.
Weldex, Inc., Detroit.
Westinghouse Electric & Manufacturing Co., East Pittsburgh.

WELDING COMPOUNDS

See Compounds, Welding

WELDING EQUIPMENT, ARC OR ELECTRIC

Atlas Welding Accessories Co., Detroit. (Weld Cleaning Tools)
Eisler Engineering Co., Newark, N. J.
Lincoln Electric Co., Cleveland. (Foot Operated Control)
Mid-States Equipment Co., Chicago. (Automatic Arc)
Tweco Products Co., Wichita, Kans. (Electrode Holders, Jig and Fixture Clamps)
Whiting Corporation, Harvey, Ill. (Positioner)

WELDING EQUIPMENT, OXY-ACETYLENE

Air Reduction Sales Co., New York City.
Allied Weld-Craft, Inc., Indianapolis.
Atlas Welding Accessories Co., Detroit 21.
Automatic Gasflux Mfg. Co., Mansfield, O.
Bastian-Blessing Co., Chicago.
Burdett Mfg. Co., Chicago.
Dockson Corporation, Detroit.
Ergolyte Manufacturing Co., Philadelphia.
Harris Calorific Co., Cleveland.
Imperial Brass Mfg. Co., Chicago.
Jewel Mfg. Co., St. Paul, Minn.
Linde Air Products Co., The, New York City.
Marquette Manufacturing Co., Inc., Minneapolis.
Milburn Co., Alexander, Baltimore, Md.
Modern Engineering Co., St. Louis.
National Cylinder Gas Co., Chicago.
Ransome Machinery Co., Dunellen, N. J. (Welding Positioner)
Reiner & Campbell Co., Inc., Elizabeth, N. J.

Smith Welding Equipment Corp., Minneapolis.
Torchweld Equipment Div., National Cylinder Gas Co., Chicago.
• Universal Power Corporation, Cleveland.
Victor Equipment Co., San Francisco.
Wall Chemicals Div., Liquid Carbonic Corp., Chicago.
Whiting Corporation, Harvey, Ill. (Positioner)

WELDING ROD

See Rod, Welding

WELDING TORCHES

See Torches, Brazing, Cutting, Welding

WHEELS, BLOWER

Advance Aluminum Castings Corp., Chicago.
• Air Controls, Inc., Cleveland.
• Bayley Blower Co., Milwaukee.
Beckett & Co., Thomas, Dallas, Tex.
Bishop & Babcock Mfg. Co., Cleveland.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Products, Inc., Irvington, N. J.
• Clarage Fan Co., Kalamazoo, Mich.
Economy Electric Manufacturing Co., Cicero, Ill.
Goettl Bros., Phoenix, Ariz.
Hastings Air Conditioning Co., Inc., Hastings, Nebr.
Jaden Mfg. Co., Hastings, Nebr.
• Janette Mfg. Co., Chicago.
• Lau Blower Co., Dayton, O.
• Morrison Products, Inc., Cleveland.
New York Blower Co., Chicago.
• Peerless Electric Co., Warren, O.
• Schwitzer-Cummins Company, Indianapolis.
• Sturtevant Co., B. F., Hyde Park, Boston.
Torrington Mfg. Co., Torrington, Conn.
Trane Company, La Crosse, Wis.
• Triangle Mfg. Co., Oshkosh, Wis.
• U. S. Air Conditioning Corp., Minneapolis.
• Utility Appliance Corporation, Los Angeles.
• Viking Air Conditioning Corp., Cleveland.
Western Blower Company, Seattle, Wash.

WINDOW FANS

See Fans, Window

WINDOWS, HEAT INSULATING

Advance Insulating Co., Pittsburgh.
Andersen Corp., Bayport, Minn.
Chamberlin Metal Weather Strip Co., Detroit.
Detroit Steel Products Co., Detroit.
Kane Mfg. Corp., Kane, Pa.
Libbey-Owens-Ford Glass Co., Toledo, O.
Mississippi Glass Company, New York City.
Pittsburgh Plate Glass Co., Pittsburgh.
Russell Co., F. C., Cleveland.
Truscon Steel Co., Youngstown, O.

WINDOWS, HOLLOW METAL

American Sheet Metal Works, New Orleans.
Biersach & Neidermeyer Co., Milwaukee.
Herrmann & Grace Co., Brooklyn.
International Steel Co., Evansville, Ind.
Jamestown Metal Corp., Jamestown, N. Y.
Newman Brothers, Inc., Cincinnati.
Perkinson & Brown, Chicago.
Russell Co., F. G., Cleveland.
Truscon Steel Co., Youngstown, O.
Willis Steel Corporation, Galesburg, Ill.

WIRE GLASS

See Glass, Wire

WIRE, PLAIN, GALVANIZED AND COPPERED

Allegheny Ludlum Steel Corp., Brackenridge, Pa. (Stainless)
Aluminum Co. of America, Pittsburgh. (Aluminum)
American Nickeloid Co., Peru, Ill. (Chrome, nickel coated)
American Steel & Wire Co., Cleveland.
Angell Nail & Chaplet Co., Cleveland.
Atlantic Steel Company, Atlanta, Ga.
Berger Mfg. Div. Republic Steel Corp., Canton, O.
• Bethlehem Steel Co., Bethlehem, Pa. (Plain, galvanized)
California Wire Cloth Corp., Oakland, Calif.
Columbia Steel Co., San Francisco.
• Continental Steel Corp., Kokomo, Ind. (Plain galvanized steel)
Copperweld Steel Co., Glassport, Pa.
• Hussey & Co., C. G., Pittsburgh.
Jones & Laughlin Steel Corp., Pittsburgh. (Galvanized)
Laclede Steel Co., St. Louis.
Page Steel & Wire Div., Monessen, Pa.
Republic Steel Corp., Cleveland. (Steel)
Roebbling's Sons Co., John A., Trenton, N. J.
Seneca Wire & Mfg. Co., Fostoria, O. (Bronze, Aluminum)
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wickwire Spencer Steel Co., New York City.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRING MACHINES

See Machines, Wiring

WRENCHES (SOCKET, OPEN END)

Snap-On Tools Corporation, Kenosha, Wis.

• Advertisement in this issue. See Index to Advertisers, page 324.

Section of American Artisan

1945 DIRECTORY OF WARM AIR HEATING, RESIDENTIAL AIR CONDITIONING AND SHEET METAL PRODUCTS

[Section 2—TRADE NAMES]

A

- AAF**—Air Filters. American Air Filter Co., Inc., Louisville, Ky.
- ABC**—Blower-Washer units. American Blower Corp., Detroit.
- ABC**—Air Conditioning Furnaces, Water Heaters, Oil Burners. Automatic Burner Corp., Chicago, Ill.
- ACB**—Metal Protecting Paint. Tropical Paint & Oil Co., Cleveland.
- A/C**—Washable Filters. American Air Filter Co., Inc., Louisville, Ky.
- A-P Dependable**—Controls. Automatic Products Company, Milwaukee.
- AMS**—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
- A-P**—Controls, Damper Regulators, Motors, Valves. Automatic Products Co., Milwaukee, Wis.
- A.R.A.**—Asbestos Return Air Sheets. Grant Wilson, Inc., Chicago.
- ASBO**—Ventilators. American Steel Band Co., Pittsburgh.
- ate**—Timing Systems. Automatic Temperature Control Co., Inc., Philadelphia.
- "A. W."**—Plates and Sheets. Alan Wood Steel Co., Conshohocken, Pa.
- Abraweld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.
- Aeco-Lastite**—Caulking Compounds. Accurate Metal Weather Strip Co., New York, N. Y.
- Aec**—Arc and Spot Welders. Pier Equipment Mfg. Co., Benton Harbor, Mich.
- Acid-Proof**—Insulating Cement. Quigley Company, New York City.
- Acidseal**—Paints and Coatings. B. F. Goodrich Co., Akron, O.
- Acollite (Bakelite)**—Enamels. Acorn Refining Co., Cleveland, O.
- Ad-Mix**—Waterproofing Compounds. Eastern States Supply Co., Brooklyn, N. Y.
- Aeratherm**—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Activ-Air**—Air Conditioning Furnaces. Heil Co., Milwaukee, Wis.
- Activ-Flame**—Oil Burners. Heil Co., Milwaukee, Wis.
- Adacast**—Refractories. Botfield Refractories Co., Philadelphia.
- Adamant**—Insulating Cement. Botfield Refractories Co., Philadelphia.
- Adapatch**—Refractories. Botfield Refractories Company, Philadelphia, Pa.
- Ada-Stic**—Insulating Cement. Botfield Refractories Co., Philadelphia, Pa.
- Adjusto**—Fire Pot Colls. Radiator Specialty Co., Charlotte, N. C.
- Aeracool**—Fan Blades, Fans, Louvres and Shutters. Ventilators. Myers Electric Co., Pittsburgh, Pa.
- Aerlaweld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.
- Aer-Nu**—Odor Adsorbers. E. A. Lundy Co., New York, N. Y.
- Aerocrat**—Blowers, Louvres, Washers. W. R. Ames Co., San Francisco, Cal.
- Aerofuse**—Air Diffusers. Tuttle & Bailey, Inc., New Britain, Conn.
- Aerolux**—A. C. Furnaces. S. T. Johnson Co., Oakland, Cal.
- Aeropel**—Kitchen Exhaust Fans. American Blower Corp., Detroit, Mich.
- Aeroplane**—Ventilators. Paul R. Jordan & Co., Indianapolis, Ind.
- Aeroplex**—Blowers. Bayley Blower Co., Milwaukee, Wis.
- Aeroplane**—Ventilators. Paul R. Jordan & Co., Indianapolis, Ind.
- Aeropull**—Ventilators. Paul R. Jordan & Co., Inc., Indianapolis, Ind.
- Aerospot**—Fans. South Bend Air Products, Inc., South Bend, Ind.
- Aerovale**—Ventilators. Knowles Mushroom Ventilator Co., Montclair, N. J.
- Afeo**—Blowers, Blower-Filters, Furnaces and Stokers. American Furnace Co., St. Louis, Mo.
- Afeo "Duo Blo"**—Furnaces. American Furnace Co., St. Louis, Mo.
- Afeo Master-Gas**—Furnaces. American Furnace Co., St. Louis, Mo.
- Afeo**—Grilles, Louvres, American Foundry & Furnace Co., Bloomington, Ill.
- Agile**—Welding Electrodes. American Agile Corp., Cleveland.
- Agitair**—Air Diffusers. Air Devices, Inc., New York City.
- Airacoustic**—Insulation. Johns-Manville, New York City.
- Airate**—Ventilators. Aeolus Dickinson, Chicago.
- Air-A-Way**—Ventilators. American Metal Products, Fort Worth, Tex.
- Airboy**—Blower Filter. The Peerless Electric Co., Warren, Ohio.
- Aircell**—Duct Insulation. Norristown Magnesia & Asbestos Co., Norristown, Pa.
- Airco**—Electrodes, Soldering Flux Welding Rod, Torches and Welding Equipment. Air Reduction Sales Co., New York City.
- Air-Con**—Heating & Ventilating Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
- Air Control**—Air Conditioning Units, Bearings, Blowers, Blower-Filters, Blower Housings and Wheels. Hastings Air Conditioning Co., Inc., Hastings, Nebr.
- Aire-Flo**—Furnaces. Lennox Furnace Co., Marshalltown, Ia.
- Air Flow**—Blowers, Fans, Blower Wheels. Goettl Bros., Phoenix, Ariz.
- Air-X-Hauster**—Ventilators. G. C. Brel-dert Co., Los Angeles.
- Aire-RAY-ator**—Furnaces. Ray Oil Burner Co., San Francisco.
- Airex**—Air Conditioning Units, Blowers Fans, Washers. Mountain States Equipment Co., Denver, Colo.
- Airfo**—Pipe, Fittings and Accessories. Milcor Steel Co., Milwaukee.
- Airfo**—Furnaces. Aladdin Heating Corp., Oakland, Cal.
- Air-Fan**—Window Ventilators. Reliable Sheet Metal Engineering Co., Chicago.
- Airfoil**—Fans and Fan Blades, Ventilators. Aero Fan Co., Piqua, O.
- Air Force**—Attic Fan. Vulcan Metal Products Co., Birmingham, Ala.
- Airguide**—Hygrometers and Thermometers. Fee & Stemwedel, Inc., Chicago, Ill.
- Airidge**—Ridge Ventilators. Aeolus Dickinson, Chicago.
- Airkem**—Air Freshening Compound. W. H. Wheeler, Inc., New York City.
- Aristocrat**—Fan Blades. Torrington Mfg. Co., Torrington, Conn.
- Airjector**—Ventilators. Swartwout Co., Cleveland.
- Air Kooler**—Evaporative Conditioners. Utility Appliance Corporation, Los Angeles.
- Air Lader**—Louvers and Shutters. Edwin F. Guth Co., St. Louis.
- Air-Lift**—Blowers and Fans. Mauer Engineering, Evanston, Ill.
- Airline**—Furnaces. Joliet Heating Corp., Joliet, Ill.
- Airline**—Registers & Grilles. Tuttle & Bailey, Inc., New Britain, Conn.
- Airline**—Ventilators. Danzer Metal Works Co., Hagerstown, Md.
- Airlok**—Mineral Wool. Plastergon Wall Board Co., Buffalo.
- Air-Marvel**—Fans. General Blower Co., Philadelphia, Pa.
- Air Master**—Buffer-Grinder. Cincinnati Electrical Tool Co., Cincinnati.
- Airmaster**—Blowers and Suction Cleaners. Skillsaw, Inc., Chicago.
- Airmat**—Filters. American Air Filter Co., Inc., Louisville, Ky.
- Airmover**—Blowers. Skuttle Mfg. Co., Detroit.
- Airmover**—Ventilators. Swartwout Company, Cleveland, O.
- Air-O-Matie**—Air Conditioning Units. Williams Oil-O-Matie Htg. Corp., Bloomington, Ill.
- Airo-Flex**—Directional Flow Registers. Auer Register Co., Cleveland.
- Airotor**—Blower Wheels. Torrington Mfg. Co., Torrington, Conn.
- Air-Pak**—Blower-Filter Units. Air Controls, Inc., Cleveland.
- Airpyrator**—Blowers. Burnwell Corp., Allentown, Pa.
- Air-Seel**—Oil Burners. Silent Glow Oil Burner Corp., Hartford, Conn.
- Airstat**—Controls. Minneapolis-Honeywell Regulator Co., Minneapolis.
- Airstream**—Blower Wheels. Morrison Products, Inc., Cleveland.
- Airstream**—Filters. A. G. Brauer Supply Co., St. Louis.
- Airtrol**—Blower-Filters. Air Control Products, Inc., Coopersville, Mich.
- Air-Van**—Roof Ventilators. Gallaher Co., Owatonna, Minn.

Air-Vane—Registers. Rock Island Register Co., Rock Island, Ill.

Airvulc—Concrete Waterproofing Paint. Self-Vulcanizing Rubber Co., Inc., Chicago, Ill.

Air-X-Hauser—Ventilators. G. C. Breidert Co., Los Angeles.

Ajax—Prefabricated Ducts, Fittings. Metal Shingles, Skylights. Cincinnati Sheet Metal & Roofing Co., Cincinnati.

Akron Air Blast—Furnaces. May-Fleberger Co., Newark, Ohio.

Albron—Aluminum Paint. Aluminum Company of America, Pittsburgh.

Alclad—Sheets. Aluminum Company of America, Pittsburgh.

Aleo—Ventilators. A. H. Lumm Co., Toledo, Ohio.

Alcoa—Aluminum Products. Aluminum Co. of America, Pittsburgh, Pa.

Alkacite—Paint. Protective Coatings, Incorporated, Detroit.

All-Alloy—Shears. Bremil Mfg. Co., Erie, Pa.

Allen-Flux—Soldering Flux. L. B. Allen Co., Inc., Chicago.

Alkote—Paint. Acme Refining Co., Cleveland.

All-Sol—Flux. L. B. Allen Co., Chicago.

Altitte—Insulation. Coast Insulating Corp., Los Angeles.

All-Weather—Roof Cement, Caulking and Waterproofing Compounds, Roofing Paint. Ford Roofing Products Company, Chicago.

Alma—Furnace Brushes. Worcester Brush & Scraper Co., Worcester, Mass.

Almar—Hand Slitting Machines. Ward Machinery Co., Chicago, Ill.

Almetal—Fire Doors. Merchant & Evans Co., Philadelphia, Pa.

Alnor—Thermometers. Illinois Testing Laboratories, Inc., Chicago, Ill.

Alumaweld—Flux and Solder. Lloyd S. Johnson Co., Chicago.

Alumbrite—Paint. Thompson & Co., Pittsburgh, Pa.

Alumi-Flux—Soldering Flux. L. B. Allen Co., Chicago, Ill.

Aluminized—Clad Sheets. American Rolling Mill Co., Middletown, Ohio.

Alumin-nu—Metal Cleaner. NuSteel Company, Chicago.

Alumi-Soder—Aluminum Solder. L. B. Allen Co., Chicago.

Aluminweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Always Reliable—Soldering Furnaces, Mallets, Torches. Otto Bernz Co., Rochester, N. Y.

Amco—Flux. American Solder & Flux Co., Philadelphia, Pa.

Amerform—Combustion Chambers, Refractories. Commonwealth Products Co., Philadelphia.

American—Crimping, Beading and Cutting Machines. Chas. E. Kraus Mfg. Co., Louisville, Ky.

Amerock—Cabinet and Casing Hardware. American Cabinet Hardware Corp., Rockford, Ill.

Amisco—Anemometers. American Instrument Co., Silver Spring, Md.

Amirglass—Air Filters. Amilton Co., New York, N. Y.

Ampac—Welders. Allis-Chalmers Mfg. Co., Milwaukee.

Ampeco—Blow Pipe Collectors. American Metal Products Co., Fort Worth, Tex.

Am-Pe-Co—Blowers. American Machine Products Co., Marshalltown, Ia.

Amplisre—Gas Burner. Surface Combustion, Toledo, Ohio.

Anacanda—Copper and Brass Products. American Brass Co., Waterbury, Conn.

Anchor—Hangers. Royal-Apex Mfg. Corp., Brooklyn, N. Y.

Anchor Brand—Soldering Flux. Garden City Laboratory, Inc., Chicago.

Anchor Brand—Nails, Rivets. Townsend Co., New Brighton, Pa.

Anchor-Kolstoker—Stoker-fired Furnaces and Stokers. Anchor Stove & Range Co., New Albany, Ind.

Anchortite—Nails. Dickson Weatherproof Nail Co., Evanston, Ill.

Anderson—Spray Nozzles. B. F. Sturtevant Co., Hyde Park, Mass.

Annite—Metal Polisher. Quigley Company, Inc., New York City.

Anti-Pluvius—Skylights. W. F. Hirschman Co., Inc., Buffalo.

Anti-Spatter—Welding Compound. Wolfe-Kote Co., Sheboygan, Wis.

Antoxide—Metal Protecting Paint. du Pont de Nemours & Company, Wilmington, Del.

Apartment—Window Ventilating Fans. Autovent Fan & Blower Div., Herman Nelson Corp., Chicago.

Apeo—Caulking Compounds, Paint. Asphalt Products Co., Syracuse, N. Y.

Apex—Furnaces. Excelsior Steel Furnace Co., Chicago.

Apex—Furnaces & Heaters. Dallman Supply Co., Sacramento, Cal.

Apex—Quadrants. Ohio Products Co., Cleveland, O.

Apex—Hangers, Elbows and Fittings. Royal-Apex Mfg. Co., Brooklyn.

Apex Exl-Air—Furnaces. Excelsior Steel Furnace Co., Chicago.

Apexior—Paint. Dampney Co. of America, Hyde Park, Boston, Mass.

Apollo—Copper Steel. Apollo Steel Company, Apollo, Pa.

Appton Super—Pneumatic Hammer. Brown-Appton Company, New York City.

Aqua Bar—Roof Cement. Continental Products Co., Euclid, O.

Aquadam—Waterproofing. Blue Ridge Talc Co., Inc., Henry, Va.

Aqua-Flo—Pumps. The Hell Co., Milwaukee.

Aqua-Master—Water Heaters. Century Eng. Corp., Cedar Rapids, Ia.

Aquanil—Waterproofing Compound and Paint. Protective Coatings, Incorporated, Detroit.

Aquard—Waterproofing Compound. Eastern States Supply Co., Brooklyn, N. Y.

Aqua-Seale—Automatic Humidifier. J. P. Glasby Mfg. Co., Bloomfield, N. J.

Aqulux—Water Heaters. S. T. Johnson Co., Oakland, Cal.

Arc-Eng—Air Conditioning Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Arcoflame—Oil Burners. American Rad. & Standard Sanitary Corp., Pittsburgh, Pa.

Aretie—Air Conditioning Units. Premier Furnace Co., Dowagiac, Mich.

Aretie Aire—Kitchen Exhaust Fans. F. A. Smith Mfg. Co., Rochester, N. Y.

Aretie Circle—Evaporative Coolers. Goettl Bros., Phoenix, Ariz.

Arex-Auster—Ventilators. Arex Company, Chicago.

Aria Accelerant—Louvers and Shutters. Arex Co., Chicago.

Aria Stationary—Louvers and Shutters. Arex Co., Chicago.

Aristocrat—Gravity Registers. Auer Register Co., Cleveland, O.

Armeo—Plates, Sheets. American Rolling Mill Co., Middletown, O.

Armeo Ingot Iron—Roofing and Sheets. American Rolling Mill Co., Middletown, O.

Arm-Glase—Glazing Compounds. Armstrong Co., Detroit.

Armerise—Paint. Carter Paint Co., Liberty, Ind.

Armstrong—Compressors. General Machinery Co., Spokane, Wash.

Arrow Gas—Furnaces. Dowagiac Steel Furnace Co., Dowagiac, Mich.

Arrowtrol—Heating and Ventilating Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Artercraft—Blowers and Furnaces. Chicago Steel Furnace Co., Chicago, Ill.

Artisan—Flux. American Solder & Flux Co., Philadelphia, Pa.

Asbestocel—Furnace Insulation. Johns-Manville, New York City.

Asbestocite—Duct Board. Johns-Manville, New York City.

ASBO—Ventilators. American Steel Band Co., Pittsburgh.

Asco—Relays, Switches, Valves. Automatic Switch Co., New York, N. Y.

Ath-A-Nor—Furnaces. May-Fleberger Co., Newark, Ohio.

Atomist—Humidifiers. American Foundry & Furnace Co., Bloomington, Ill.

Atticvane—Attic Fans. B. F. Sturtevant Co., Boston.

Auto—Humidifier Valves. Maid-O'-Mist, Inc., Chicago.

Autochemie Eutector—Soldering Flux. Eutectic Welding Alloys Co., New York City.

Autoeal—Stokers. Crane Co., Chicago.

Autocrat—Fan Blades. Torrington Mfg. Co., Torrington, Conn.

Autocrat—Oil Burners. Chandler Company, Cedar Rapids, Iowa.

Automatic—Air Conditioning Furnaces. Premier Furnace Co., Dowagiac, Mich.

Aviation—Snips. Penn Tool Co., Philadelphia.

Axide—Fans. B. F. Sturtevant Co., Boston.

Axiom—Filters. Blockson & Company, Michigan City, Ind.

B

BB—Blast Gates, Roof Clips, Damper Clips and Tips, Conductor Fittings and Accessories. Snow Guards, Berger Brothers Company, Philadelphia.

B & B—Fans, Louvers & Shutters. Blower Wheels. Bishop & Babcock Mfg. Co., Cleveland.

BCA—Ball Bearings. Bearing Co. of America, Lancaster, Pa.

BE—Blowers, Blower-Filters, Fans. Barrett Engineers, Cleveland Heights, Ohio.

B. F. C.—Gas Burners. Moncrief Furnace & Mfg. Co., Dallas, Tex.

B-H—Insulating Cement. Baldwin-Hill Co., Trenton, N. J.

B-H Weatherseal—Waterproofing Compound. Baldwin-Hill Co., Trenton, N. J.

B & W—Refractories & Stokers. Babcock & Wilcox Co., New York City.

Baco—Refractories. Bird Archer Co., Philadelphia.

Badger—Filters. Air Devices, Inc., New York City.

Badger—Time Switches. Reliance Automatic Lighting Co., Racine, Wis.

Baers—Enamels, Lacquers and Paint. Baer Brothers, New York City.

Baffle Mix—Refractories. Walsh Refractories Corp., St. Louis.

Balsam—Wool—Flexible Insulation. Wood Conversion Co., St. Paul.

Bankheat—Oil Burners. S. T. Johnson Co., Oakland, Cal.

Bantam—Motors. Small Motors, Inc., Chicago.

Barber-Genasco—Roofing Cement, Waterproofing Compounds, Paint, Roofing. Babbitt-Barber Asphalt Products, Inc., Madison, Ill.

Bar-Brook—Fans, Evaporative Coolers, Ventilators. Shreveport Eng. Co., Inc., Shreveport, La.

Hardamp — Waterproofing Compounds. Acorn Refining Company, Cleveland.

Barlastic—Caulking Compounds. Barland Weatherstrip Material Co., Cleveland.

Bar-Ox—Rust Inhibitor. Truscon Laboratories, Detroit.

Barreled Sunlight—Paint and Enamel. U. S. Gutta Percha Paint Co., Providence, R. I.

Barry—Pillow Blocks, Pulleys. R. & J. Dick Co., Inc., Passaic, N. J.

Barthel — Soldering Furnaces and Torches. J. A. Sanders, Fulton, N. Y.

Barton—Blower-Filterers, Furnace Blowers, Cabinets and Casings, Air Conditioning and Gravity Furnaces, Heaters, Housings and Stampings. National Mfg. & Engineering Co., Detroit.

Basmer — Air Conditioning Furnace. Bastian - Morley Co., Inc., LaPorte, Ind.

Battery—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Bear Cat—Booster Fans. Midwestern Supply Co., Bloomington, Ill.

Beaver—Furnaces and Heaters. Danville Stove & Mfg. Co., Danville, Pa.

Beckett Commodore—Oil Burners. R. W. Beckett Eng. Co., Elyria, O.

Beehive—Roofing. Samuel Cabot, Inc., Boston, Mass.

Beloit—Machines, Punches, Tools. Hendley & Whittemore Co., Beloit, Wis.

Bemis—Furnace Brushes. Worcester Brush & Scraper Co., Worcester, Mass.

Benda-Vane—Registers. Rock Island Register Co., Rock Island, Ill.

Bend-Ezy—Grilles and Registers. Standard Stamping & Perforating Co., Chicago.

Bengal—Furnaces. Floyd-Wells Co., Royersford, Pa.

Berley — Building Products. Berger Mfg. Co., Div. Republic Steel Corp., Canton, O.

Best—Cast Iron Chimney Caps. Sterling Foundry Co., Sterling, Ill.

Beth-Cu-Loy—Sheets. Bethlehem Steel Co., Bethlehem, Pa.

Bethlehem Doe—Oil Burners. Bethlehem Fdy. & Mach. Co., Bethlehem, Pa.

Bettendorf—Oil Burners. Lennox Furnace Co., Marshalltown, Iowa.

Betterbuilt — Registers. Air Control Products, Inc., Coopersville, Mich.

Big Sioux—Furnaces. Iowa Foundry Co., Sioux City, Iowa.

Bildrite—Sheathing. Insulite Div. Minnesota & Ontario Paper Co., Minneapolis.

Blitwel—Furnaces. Fraser & Johnston Co., San Francisco.

BI-MIX—Gas Burners. John Zink Co., Tulsa, Okla.

Bitumastic No. 50 — Compounds and Paint. Wallis Dove-Hermiston Corp., Westfield, N. J.

Bitumastic Black Solution — Paint. Wallis Dove-Hermiston Corp., Westfield, N. J.

Bitumastic 70 B — Enamel. Wallis Dove-Hermiston Corporation, Westfield, N. J.

Bituseal—Paint. Cheesman-Elliott Co., Inc., Brooklyn.

Black Diamond—Built-up Roofing. Barrett Div., Allied Chemical & Die Corp., New York, N. Y.

Black Diamond — Furnaces, Heaters. Maple City Furnace Co., Monmouth, Ill.

Black Diamond—Stokers. Beckley Perforating Co., Garwood, N. J.

Blaze Proof Silver-Lume—Paint. Wilbur & Williams Co., Boston.

Blo-Aire—Blower-Filter Units. Meyer Furnace Co., Peoria, Ill.

Blo-Fan—Kitchen Exhaust Fans. Pryne & Co., Los Angeles.

Blowertrol — Thermostatic Hydraulic Control. White Mfg. Co., St. Paul.

Blowette — Blower-Filter Units. Lau Blower Co., Dayton, Ohio.

Bluebird—Snips. Bergman Tool Mfg. Co., Buffalo.

Blue Flame—Rotary Oil Burners. Silent Glow Oil Burner Corp., Hartford, Conn.

Blue Knight—Enamels and Lacquers. Roxalin Flexible Finishes, Inc., Elizabeth, N. J.

Blue-Point — Drills, Tools. Snap-on Tools Corp., Kenosha, Wis.

Blue Ridge—Wire Glass. Libbey-Owens-Ford Glass Co., Toledo, Ohio.

BNCO—Metal Windows, Doors, Skylights, Welding and Sheet Metal Work. Biersach & Neidermeyer Co., Milwaukee, Wis.

Boiler Plate — Furnaces. Williamson Heater Co., Cincinnati, O.

Bonderizing—Metal processes. Parker Rust-Proof Co., Detroit.

Boomer—Furnaces, Heaters. Hess-Snyder Co., Massillon, O.

Boost-Aire—Fans. L. J. Mueller Furnace Co., Milwaukee.

Bower—Bearings. Ahlberg Bearing Co., Chicago.

Branford—Oil Burners. Malleable Iron Fittings Co., Branford, Conn.

Brasare—Electrodes. Universal Power Corporation, Cleveland.

Braso—Bronze Soldering Flux. Linde Air Products Co., New York City.

Brees-Air—Fans. Buffalo Forge Co., Buffalo, N. Y.

Breese Hydroxylating—Oil Burners. Oil Devices, Chicago.

Breese—Kitchen Exhaust Fans. Buffalo Forge Co., Buffalo, N. Y.

Brevokrak—Crackle Finish Paint. Zapon Div., Atlas Powder Co., North Chicago, Ill.

Brilliant Fire — Floor Furnaces and Heaters. Ohio Foundry and Mfg. Co., Steubenville, O.

Brillion—Furnaces, Heaters. Stainless & Steel Products Co., St. Paul, Minn.

Bronzend — Electrodes. Arcos Corp., Philadelphia.

Brookecell — Metal Ceilings. Brooklyn Metal Ceiling Co., Brooklyn, N. Y.

Brownskin—Waterproof Sheathing Paper. Angler Corp., Framingham, Mass.

Bull Dog—Snips and Shears. Wiss & Sons Co., Newark, N. J.

Bumble Bee—Welder. Wilson Welder & Metals Co., Inc., New York City.

Bung-Le—Warm Air Furnaces. Geo. J. Cocking, Santa Ana, Cal.

Bunker Hill—Roofing, Sheets and Solder. Northwest Lead Co., Seattle, Wash.

Bu-Pro-Fire—Furnaces, Heaters. Tennessee Enamel Mfg. Co., Nashville, Tenn.

Burke—Super Turbine Pumps. Decatur Pump Co., Decatur, Ill.

Burner-Set—Castable Refractory. Pilbrico Jointless Firebrick Co., Chicago.

Burnham—Pumps. Union Steam Pump Co., Battle Creek, Mich.

Butler—Furnaces. Ramey Mfg. Co., Columbus, O.

Butler—Stokers. Whiting Stoker Sales Co., Chicago.

But-N-tite—Steel Roofing. St. Paul Corrugating Co., St. Paul.

Buxser — Gas Soldering Furnaces. Charles A. Honea, Inc., Baldwin, N. Y.

C

CDC—Bearings, Couplings, Pulleys. Chicago Die Casting Company, Chicago.

C-H—Relays, Switches and Valves. Cutler - Hammer, Inc., Milwaukee, Wis.

CID—Pumps. Goulds Pumps, Inc., Seneca Falls, N. Y.

C & L — Soldering Furnaces and Torches. Clayton & Lambert Mfg. Co., Dearborn, Mich.

C J B—Bearings. Ahlberg Bearing Co., Chicago.

C.M.W.—Stokers. Catskill Metal Works, Catskill, N. Y.

C.M.W. Hot Water Maker—Stoker-Fired Water Heater. Catskill Metal Works, Inc., Catskill, N. Y.

CP—Electric Tools. Chicago Pneumatic Tool Co., New York City.

C-10—High Temperature Paint. Laclede-Christy Clay Products Co., St. Louis.

Calktite — Caulking Compounds. U. S. Stoneware Co., Akron, Ohio.

Caloric — Furnaces. Marshall Furnace Co., Marshall, Mich.

Calorider—Air Conditioning Units. General Air Conditioning Corp., Cincinnati.

Calwico—Machinery Guards and Wire Cloth. California Wire Cloth Corp., Oakland, Cal.

Camel — Valves. C. L. Bryant Corp., Cleveland, O.

Cantilever — Hygrometers. Standard Thermometer, Inc., Boston.

Capillary—Air Conditioning Units, Filters, Washers. Air & Refrigeration Corp., New York City.

Capital—Furnaces. Farris Furnace Co., Springfield, Ill.

Capitol Rock Wool—Insulation. Standard Lime & Stone Co., Baltimore.

Capitolaire — Furnaces. United States Radiator Corp., Detroit.

Carbonaire — Oil Burners. Aldrich Co., Wyoming, Ill.

Carend—Electrodes. Arcos Corp., Philadelphia.

Careycel—Insulation. Philip Carey Co., Lockland, Ohio.

Careycelad — Metal Protecting Paint. Philip Carey Mfg. Co., Lockland, O.

Careyduct — Prefabricated Ducts and Fittings. Philip Carey Co., Lockland, Ohio.

Carter—Oil Burners. General Oil Heating Corp., West New York, N. J.

Carton Economy — Furnaces. International Heater Co., Utica, N. Y.

Castalu—Blower Wheels and Fans. Advance Aluminum Castings Corp., Chicago, Ill.

Castinaare—Electrodes. Universal Power Corp., Cleveland.

Cast-Refract — Baffles. Quigley Company, Inc., New York City.

Caulk-N-Seal — Caulking Compound. Blue Ridge Talc Co., Inc., Henry, Va.

Caulk-O-Seal — Caulking and Glazing Compounds. Calbar Paint & Varnish Co., Philadelphia, Pa.

Cauxeal — Compounds. X-Pando Corporation, Long Island City, N. Y.

Ce-Co—Caulking Compounds and Paints. Cheesman - Elliott Company, Inc., Brooklyn.

Cecotite — Roofing Paint. Cheesman-Elliott Company, Inc., Brooklyn.

Cello-Sponge—Evaporators. Viking Air Conditioning Corp., Cleveland.

Cell-U-Blanket — Insulation. Masonite Corp., Chicago.

Cellufoam — Duct Insulation. Masonite Corporation, Chicago.

Cementico — Concrete Waterproofing Paint. United States Gypsum Co., Chicago.

Cementseal — Enamels & Paint. Acorn Refining Co., Cleveland.

Cementite — Paint. Thompson & Co., Pittsburgh, Pa.

Cementkote — Paint. Tropical Paint & Oil Co., Cleveland, O.

Cemesto — Duct Boards. Celotex Corporation, Chicago.

Cempro — Concrete Paint. Asphalt Products Co., Syracuse, N. Y.

Centripeller — Ventilating Fans. Paul R. Jordan & Co., Inc., Indianapolis.

Certified — Conditioning Units, Furnaces, Heaters. Stainless & Steel Products Co., Saint Paul, Minn.

Challenger — Domestic Stokers. Link Belt Co., Chicago.

Challenger — Stokers. Kol-Master Corp., Oregon, Ill.

Chamberlin — Automatic Humidifier. Chandler Co., Cedar Rapids, Ia.

Champion — Furnaces. Wheeling Furnace Corp., Martins Ferry, Ohio.

Checker Coat — Sheets. Continental Steel Corp., Kokomo, Ind.

Chicago — Brakes and Presses. Drels & Krump Mfg. Co., Chicago, Ill.

Chicago — Stokers. Eddy Stoker Corporation, Chicago.

Chicago-Wrigley — Toggle and Anchor bolts. Chicago Expansion Bolt Co., Chicago.

Chicastic Castable — Refractory. Chicago Fire Brick Co., Chicago, Ill.

Chico Brickset — High Temperature Cement. Chicago Fire Brick Co., Chicago, Ill.

Chief — Furnaces. Joliet Heating Corp., Joliet, Ill.

Chieftain — Refrigerating Compressors. Tecumseh Products Co., Tecumseh, Mich.

Chinook — Heating Coils. Bayley Blower Co., Milwaukee, Wis.

Chinookfin — Heating Coils. Bayley Blower Co., Milwaukee, Wis.

Chromang — Electrodes. Arcos Corporation, Philadelphia.

Chromend — Electrodes. Arcos Corporation, Philadelphia.

Chromeweld — Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Chromium 173 Silver — Aluminum Paint. C. H. Dragert Company, Inc., Brooklyn.

Chromlead — Enamels and Lacquers. Dragert Co., C. H., Inc., Brooklyn.

Chromtrim — Light Weight Shapes, Mouldings, Trim, Tubing and Fittings. R. D. Werner Co., Inc., New York City.

Chronat — Furnace and Boiler Repairs. National Fdry. & Furnace Co., Dayton, O.

Chronotherm — Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Chrysler-Airtemp — Heating and Cooling Equipment. Airtemp Div., Chrysler Corp., Dayton, Ohio.

Cibulas — Puttyless Skylights. General Sheet Metal Works, Inc., Bridgeport, Conn.

Cinch — Expansion Bolts. National Lead Co., New York City.

Cinkote — Paint. Blue Ridge Talc Co., Inc., Henry, Va.

Circle T — Switches. Trumbull Electric Mfg. Co., Plainville, Conn.

Circu — Louvers & Shutters. Circulators & Devices Mfg. Corp., New York City.

CirCOOLator — Fans and Ventilators. Viking Air Conditioning Corporation, Cleveland, O.

Circulaire — Heaters. J. V. Patten Co., Sycamore, Ill.

Circu-Ray — Furnaces and Heaters. Tennessee Enamel Mfg. Co., Nashville, Tenn.

Clason — Snow Guards. M. N. Cartier & Sons Company, Providence, R. I.

Class 60 — Fuel Oil Pumps. Kraissl Company, Inc., Hackensack, N. J.

Classie — Heating & Ventilating Registers. Auer Register Co., Cleveland, O.

Clean-Aire — A. C. Furnaces. Harvey-Whipple, Inc., Springfield, Mass.

Cleannaire — Blower-Filters. Peerless Foundry Co., Indianapolis, Ind.

Cleveland — Furnaces. Dornback Furnace & Fdy. Co., Cleveland.

Climate - Changer — Air Conditioning Units. Trane Co., La Crosse, Wis.

Climate Master — Oil Burning Air Conditioning Furnaces. Hess Warming & Ventilating Co., Chicago, Ill.

Climator — Blower-Filter Units. L. J. Mueller Furnace Co., Milwaukee.

Climatrol — Furnaces. L. J. Mueller Furnace Co., Milwaukee.

Clincher — Conductor Fittings and Accessories. Milcor Steel Co., Milwaukee.

Colalloy — Light Weight Shapes, Plates. Colonial Alloys Co., Philadelphia.

Coldstream — Air Conditioning Units. Baker Ice Machine Company, Inc., Omaha, Nebr.

Collopakes — Roofing Paint. Samuel Cabot, Inc., Boston.

Colonial — Blower-Filters, Oil Burners, Furnaces, Humidifiers, Heaters, Stokers. Green Colonial Furnace Co., Des Moines, Ia.

Colonial — Conductor Heads and Fittings. Royal-Apex Mfg. Corp., Brooklyn.

Colonial — Gravity Registers. Auer Register Co., Cleveland, O.

Colortipt — Arc Welding Electrodes. Wilson Welder & Metals Co., Inc., New York City.

Columbia — Ventilators. E. E. Souther Iron Co., St. Louis.

Columbus — Humidifiers. Fred D. Pfening Co., Columbus, Ohio.

Columbus — Ventilators. F. O. Schoedinger, Columbus, O.

Combustioneer — Stokers. Steel Products Engineering Co., Springfield, O.

Comet Exhaustair — Fans and Ventilators. New York Blower Co., Chicago, Ill.

Comfort — Furnaces. May - Flebeger Company, Newark, Ohio.

Comfort Air — Humidifiers. Comfort Products Corporation, Harvey, Ill.

Comfortaire — Furnaces. Hammel Radiator Engineering Co., Los Angeles.

Comfortmaker — Furnaces. Joliet Heating Corp., Joliet, Ill.

Comfortrol — Blowers and Blower Units, Furnaces. Waterman-Waterbury Co., Minneapolis.

Comfortrol — Effective Temperature Control. Fries Instrument Div., Towson, Md.

Commander — Furnaces. Peerless Foundry Co., Indianapolis, Ind.

Co-Min-Co — Insulating Cement. United States Mineral Wool Co., Chicago.

Compact — Blowers. Bishop & Babcock Mfg. Co., Cleveland, O.

Compact — Oil Burners. The Aldrich Co., Wyoming, Ill.

Compactaire — Air Conditioning Furnaces. Glasby Mfg. Co., Inc., J. P., Bloomfield, N. J.

Condor — Belts. Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., Passaic, N. J.

Conl-Vane — Ventilators. Allen Corp., Detroit.

Conservoil — Oil Burners. Crane Company, Chicago.

Consisto-Weld — Welding Compound. Turco Products, Inc., Los Angeles.

Consolair — Circulating Heaters. Hammel Radiator Eng. Co., Los Angeles.

Conterflow — Air Conditioning Furnaces. Western Blower Co., Seattle.

Con-Tek — Waterproofing Compounds. Eastern States Supply Co., Brooklyn, N. Y.

Control-O-Gas — Valves. Payne Furnace & Supply Co., Beverly Hills, Cal.

Controlaire — Furnaces. St. Louis Furnace Mfg. Co., St. Louis.

Convecter — Furnaces. L. J. Mueller Furnace Co., Milwaukee, Wis.

Convecter — Humidifiers. Maid-O'-Mist, Inc., Chicago.

Convert — Gas Burners. Columbia Burner Company, Toledo, Ohio.

Coolair — Fans and Ventilators. American Coolair Corp., Jacksonville, Fla.

Coolero — Ventilators. W. F. Hirschman Co., Inc., Buffalo.

Coolite — Heat Absorbing Glass. Mississippi Glass Company, New York City.

Copperior — Sheets. Superior Sheet Steel Co., Canton, O.

Copperakin — Waterproof sheathing paper. Angier Corp., Framingham, Mass.

Cop-R-Loy — Copper Bearing Steel Sheets. Wheeling Steel Corp., Wheeling, W. Va.

Copruf — Roofing. Copper Roofs Corporation, Milwaukee.

Copruf Valley — Flashings. Copper Roofs Corporation, Milwaukee.

Co-Res-Co — Coatings, Caulking Compounds, Lacquers, Metal Protecting Paint. Cordo Chemical Corp., Norwalk, Conn.

Corinco — Insulation. Cork Insulation Co., Inc., New York, N. Y.

Corkboard — Insulation. Armstrong Cork Co., Lancaster, Pa.

Corona — Dust Separator and Collector. Clark Dust Control Company, Chicago.

Cottrell — Dust Collectors. Research Corporation, New York City.

Cottrell Process — Collectors. Western Precipitation Corp., Los Angeles.

Crane Basmor — Bastian-Morley Co., Inc., LaPorte, Ind.

Creseent — Furnaces. Green Colonial Furnace Co., Des Moines, Ia.

Creseent — Oil Burners. Caloroll Burner Corp., Hartford, Conn.

Creseent — Furnaces. Crane Company, Chicago.

Creseent — Skylights, Ventilators. American Sheet Metal Works, New Orleans, La.

Crest — Heaters. Day & Night Mfg. Co., Monrovia, Cal.

Crestoloy — Tools. Crescent Tool Co., Jamestown, N. Y.

Cromaloy — Stainless Soldering Flux. Linde Air Products Co., New York City.

Crucibleweld — Arc Welding Electrodes. Westinghouse Electric & Mfg. Co., East Pittsburgh.

Crossader — Oil Burners. Bethlehem Fdry. & Mach. Co., Bethlehem, Pa.

Crystal — Crackle Finish Paint. Hilo-Varnish Corp., Brooklyn.

Custom-Aire — Furnaces and Heaters. Heating Equipment Co., San Francisco.

Cyclops — Bearings. Roller Bearing Co. of America, Trenton, N. J.

D

D&E—Vacuum Furnace Cleaners, Stokers. Dickson Coal Co., New York City.

DL—Controls, Filters, Relays, Switches, Thermostats, Transformers and Solenoid Valves. Detroit Lubricator Co., Detroit.

D-Q—Furnace Vacuum Cleaners. Densmore-Quinlan Co., Kenosha, Wis.

Dakota—Oil Burners. Fargo Foundry Co., Fargo, N. D.

Dampertrol—Controls. Hotstream Heater Co., Cleveland.

Dana—Fans, Fume Exhausters, Louvers, Ventilators. Geo. B. Klee Co., Cincinnati.

Da-Nite—Acratherm. Minneapolis-Honeywell Reg. Co., Minneapolis.

Daptoblu—Gas Burners. Beck Engineering Combustion Kompany, St. Louis.

Dasco—Punches, Tools. Damascus Steel Products Corporation, Rockford, Ill.

Dayton Thorobred—V-Belts. Dayton Rubber Mfg. Co., Dayton, Ohio.

Day-Steel—Pulleys. Dayton Rubber Mfg. Co., Dayton, Ohio.

Deeo—Metal Shingles. Cincinnati Sheet Metal & Roofing Co., Cincinnati.

Decoseal—Paints. Debevoise Co., Brooklyn.

Defender—Oil Burners. Silent Glow Oil Burner Corp., Hartford, Conn.

Defecto—Ventilators. The Day Co., Minneapolis, Minn.

Defectrol—Duct Turning Vanes. Barber-Colman Co., Rockford, Ill.

Degraco—Enamels, Lacquers and Paints. Detroit Graphite Co., Detroit.

Dehydrantline—Waterproofing. A. C. Horn Co., Long Island City.

Delon—Time Switches. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Delco-Heat—Oil Burners, Furnaces, Motors, Pumps and Stokers. Delco Appliance Div., General Motors Corp., Rochester, N. Y.

DeLuxe—Air Conditioning Furnaces. Williamson Heater Co., Cincinnati.

DeLuxe—Gravity Furnaces. Dowagiac Steel Furnace Co., Dowagiac, Mich.

DeLuxe—Heaters. Agricola Furnace Co., Inc., Gadsden, Ala.

Deoxidine—Metal Protecting Paint. American Chemical Paint Co., Ambler, Pa.

Dependable—Paint. Heath & Milligan Mfg. Co., Chicago, Ill.

Dereka—Paint. Debevoise Co., Brooklyn, N. Y.

De-Sta-Co—Blower Housings and Stampings. Detroit Stamping Co., Detroit.

Detroit LoStoker—Stokers. Detroit Stoker Co., Detroit.

Detroit RotoStoker—Overfeed Spreader Stoker. Detroit Stoker Co., Detroit.

Detroit UniStoker—Stokers. Detroit Stoker Co., Detroit.

Dew-Aire—Air Conditioning Units. Standard Computing Scale Co., Detroit.

Dexter Heat Valve—Ridge Ventilators. Swartwout Co., Cleveland.

Dexter-Tubular—Locks and Latches. National Brass Co., Grand Rapids 2, Mich.

Dial-Set—Stokers. Kol-Master Corp., Oregon, Ill.

Diamond—Compounds, Enamels, Lacquers and Paint. Thompson & Co., Pittsburgh, Pa.

Diamond—Smoke Pipe Dampers. Adams Company, The, Dubuque, Ia.

Diamond H—Controls, Relays, Switches. Hart Mfg. Co., Hartford, Conn.

Di-Areo—Precision Machines. O'Neill-Irwin Mfg. Co., Minneapolis.

Dickinson—Ventilators. Aeolus Dickinson, Chicago, Ill.

Dickrope—V-type Belts. R. & J. Dick Co., Passaic, N. J.

Dike—Furnace Cement. George B. Klee Co., Cincinnati, O.

Di-Mol—Hack Saws. Henry Disston & Sons, Inc., Philadelphia.

Directaire—Air Conditioning Furnaces. Fitzgibbons Boiler Co., Inc., New York City.

Directerm—Furnaces. Airtherm Mfg. Co., St. Louis.

Dixigas—Gas Welding Rod. Atlantic Steel Co., Atlanta, Ga.

DixiPeer—Electrodes. Atlantic Steel Co., Atlanta, Ga.

Dixisteel—Angles, Bars, Channels, Rivets, Wire. Atlantic Steel Co., Atlanta, Ga.

Do-All—Combination Hammer and Drill. Wodack Electric Tool Corp., Chicago.

Doall—Buffers, Grinders, Polishers & Sanders. Continental Machines Incorporated, Minneapolis.

Doall Metalmaster—Contour cutting saw. Continental Machines Incorporated, Minneapolis.

Doall 100-Ton Hydraulic—Press. Continental Machines, Inc., Minneapolis.

Dorwil—Utility Room Furnaces. Gibraltar Engineering Co., Los Angeles.

Double Diamond—Humidistats, Psychrometers, Relays, Switches, Thermometers. H-B Instrument Company, Philadelphia, Pa.

Double-Duty—Oil Burners. Aldrich Co., Wyoming, Ill.

Double-Lock—Roofing. Copper Roofs Corporation, Milwaukee.

Double-Seal—Humidifier Fittings. Hays Mfg. Co., Erie, Pa.

Dover-Imperial—Eaves Trough Hangers. Ohio Wire Products Co., Dover, Ohio.

DovRloy—Sheets. Reeves Steel & Mfg. Co., Dover, Ohio.

Downmetal—Plates and Sheets. Dow Chemical Co., Midland, Mich.

Draft-A-Justor—Barometric Dampers. Preferred Utilities Mfg. Corp., New York City.

Draft Korektor—Damper. Cole-Sullivan Engineering Co., Minneapolis.

Draftmaster—Barometric Draft Controls. Platt Products Corp., Lansing, Mich.

Draftender—Motors and Regulators. Penn Electric Switch Co., Goshen, Ind.

Draft-O-Stat—Draft Regulators and Smoke Pipe Dampers. Hotstream Heater Company, Cleveland.

Drafrite—Draft Gages. Bacharach Industrial Instrument Co., Pittsburgh.

Dreadnaught—Soldering Torches and Furnaces. P. Wall Mfg. Supply Co., N. S. Pittsburgh.

Drifilter—Filters. American Air Filter Co., Inc., Louisville, Ky.

Dri-Lap—Roofing. Globe Iron Roofing & Corrugating Co., Newport, Ky.

Dri-N-Tite—Cement. A. C. Horn Co., Long Island City, N. Y.

Drivall—Waterproofing Compound. The Glidden Co., Cleveland.

Dron-ve-lite—Skylights. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Dual-Clone—Blow Pipe Collectors. Day Co., Minneapolis.

Dubestos—Prefabricated Ducts. Dutton Asbestos & Supply Co., San Francisco.

Dubblisec—Sheeting. Masonite Corp., Chicago.

Duco—Enamels and Lacquers. E. I. du Pont de Nemours & Co., Wilmington, Del.

Ducon—Controls, Soldering Coppers. Dual Remote Control Co., Wayne, Mich.

Ductboard—Prefabricated Ducts. Sall Mountain Co., Chicago.

Duct Soundliner—Duct Insulation. Baldwin-Hill Company, Trenton, N. J.

Ducturnas—Vanes. Tuttle & Bailey, Inc., New Britain, Conn.

Ductype—Blowers. South Bend Air Products, Inc., South Bend, Ind.

Dukrome—Metal Protecting Paint. du Pont de Nemours & Co., Wilmington, Del.

Dul-Kote—Sheets. Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Dulux—Enamels, Lacquers and Paints. E. I. du Pont de Nemours & Co., Wilmington, Del.

Dunco—Relays, Switches, Thermostats. Struthers Dunn, Inc., Philadelphia.

Duplicate—Safety Glass. Pittsburgh Plate Glass Co., Pittsburgh.

Duplex—Flashings. Chase Brass & Copper Co., Incorporated, Waterbury, Conn.

Duplex—Insulation. Keasbey & Mattison Co., Ambler, Pa.

Dura—Furnaces, Heaters. Barry Furnace Co., Hamilton, O.

Dur-A-Ble—Furnaces. St. Louis Furnace Mfg. Co., St. Louis.

DuraBilt—Gravity Registers. Auer Register Co., Cleveland, Ohio.

Dura-Flex—Directional Flow Registers. Auer Register Co., Cleveland.

Dura-Line—Heating & Ventilating Registers. Auer Register Co., Cleveland.

Dura-Sheen—Flues and Roof Jacks. Baltimore Enamel and Novelty Co., Baltimore.

Dura-Steel—Registers. Middleton Mfg. & Sales Co., Minneapolis.

Duratite—Glazing Compounds. Tropical Paint & Oil Co., Cleveland.

Durex—Bearings. General Motors Corp., Moraine Products Div., Dayton, Ohio.

Durimet—Acid Resisting Sheets. Duriron Co., Dayton, O.

Duronze—Plates and Sheets. Bridgeport Brass Co., Bridgeport, Conn.

Duroplastic—Caulking & Glazing Compounds. Acorn Refining Co., Cleveland.

DustStop—Filters. Owens-Corning Fiberglass Corp., Toledo, Ohio.

Dustube—Cloth Bag Type Dust Collectors. American Foundry Equipment Co., Mishawaka, Ind.

Dutch Boy—Paint and Solder. National Lead Co., New York City.

Dux-Sulation—Duct Insulation. Grant Wilson, Inc., Chicago, Ill.

Dye-Crete—Concrete Paint. Wilbur & Williams Co., Boston.

Dynaflo—Blowers. South Bend Air Products, Inc., South Bend, Ind.

Dynetric—Balancing Equipment. Gisholt Machine Co., Madison, Wis.

E

EM—Motors—Electric Machinery Mfg. Co., Minneapolis.

"EX"—Spray Nozzles. Bayley Blower Co., Milwaukee, Wis.

E-Z Arc—Arc Welders. Will-Weld Mfg. Co., Omaha, Nebr.

Eagle Deluxe—Motors. Small Motors, Inc., Chicago, Ill.

Eagle Mineral Wool—Insulation. Eagle-Picher Lead Co., Cincinnati, O.

Eagle Star—Solder. Eagle-Picher Lead Co., Cincinnati.

Eagle Super—Insulating Cement and Flashing. Eagle-Picher Lead Co., Cincinnati, O.

Eagle Super "66"—Furnace Insulation. Eagle-Picher Lead Co., Cincinnati, O.

Eagle Supertemp—Duct Insulation. Eagle-Picher Lead Co., Cincinnati, O.

Eagle Tin-Loy—Tinning Compounds. Eagle-Picher Lead Co., Cincinnati, O.

Earle—Ventilators. Berger Bros. Co., Philadelphia, Pa.

East Wind—Window Fans. American Metal Products Co., Fort Worth, Tex.

Easternoil—Oil Burners. Eastern Oil & Equipment Co., Portland, Me.

Easy—Buffers, Grinders, Polishers and Sanders. Detroit Surfacing Machine Co., Detroit.

Easy Head—Eaves Trough and Gutters. St. Paul Corrugating Co., St. Paul, Minn.

Easy-Flu—Solder. Handy & Harman, New York, N. Y.

Easy-Slip—Conductor Pipe, Eaves Trough and Gutters. La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.

Easyweld—Electrodes. Universal Power Corporation, Cleveland, O.

Echo—Ceiling Ventilators. Elgo Shutter & Mfg. Co., Detroit, Mich.

Econocel—Stokers. Cotta Transmission Corp., Rockford, Ill.

Economizer—Nozzles. Bahnson Co., Winston-Salem, N. C.

Economy—Power Hack Saws. F. L. Robertson, Buffalo, N. Y.

Economy—Furnaces, Heaters. International Heater Co., Utica, N. Y.

Economy—Adjustable Buffing Hoods. Kirk & Blum Mfg. Co., Cincinnati, O.

Economy—Gravity Registers. Auer Register Co., Cleveland, O.

Economy—Ventilators. Arex Company, Chicago, Ill.

Econo-Therm—Registers. Middleton Mfg. & Sales Co., Minneapolis, Minn.

Edge Seal—Filters. Wilson & Co., Inc., Chicago, Ill.

Edgers—Hand Flanging Machines. Packham Crimper Co., Mechanicsburg, O.

Effice—Louvers, Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

80-FWA—Utility Room Furnace. Fitzgibbons Boiler Co., Inc., New York, N. Y.

Elasticon—Roofing Paint. A. C. Horn Co., Long Island City, L. I., N. Y.

Elastikote—Paint, Tropical Paint & Oil Co., Cleveland, O.

El Dryol—Waterproofing Compound. Gerard Chemical Co., Elizabeth, N. J.

Electric City—Gutter Forming Machines. F. L. Robertson, Buffalo, N. Y.

Electric Filter Watchman—Air Filter Gauge. Herbusch Corp., St. Louis, Mo.

Electric Furnace—Fire Brick. Chicago Fire Brick Co., Chicago, Ill.

Electric Furnace Man—Domestic Stoker. General Machine Co., Inc., Emmaus, Pa.

Electric Janitor—Controls and Regulators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Electric Piston—Damper Motors and Draft Regulators. Hotstream Heater Co., Cleveland.

Electrolaire—Air Conditioning Furnaces. Electrol Mfg. Co., Passaic, N. J.

Electro-Matic—Filters. American Air Filter Co., Inc., Louisville, Ky.

Electronic Tornado—Arc Welders. Lincoln Electric Co., Cleveland, O.

Electropump—Water Circulating Pump. Well Pump Company, Chicago, Ill.

Electro-Sheet—Roofing. American Brass Co., Waterbury, Conn.

Electro Way—Fans. Ward Mfg. Co., Plymouth, Mich.

Electro-Wind—Ventilators. Allen Corp., Detroit, Mich.

Elgin—Brazing Torches and Welders. Borm Mfg. Co., Elgin, Ill.

Elgin—Louvers and Shutters. Elgo Shutter & Mfg. Co., Detroit, Mich.

El Glykol—Waterproofing Compound. Gerard Chemical Co., Elizabeth, N. J.

Elhte—Gravity Registers. Auer Register Co., Cleveland, O.

Elasco—Motors. Electric Sprayit Co., Sheboygan, Wis.

Eltum—Duct Turning Vanes. Barber-Colman Co., Rockford, Ill.

Emerson, Jr.—Emerson Electric Mfg. Co., St. Louis, Mo.

Empire—Mallets. Greene, Tweed & Co., Bronx, N. Y.

Enamel-Kote—Enamels. Acme White Lead & Color Works, Detroit, Mich.

Endurance—Cement and Paint. Glidden Company, Cleveland, O.

Enduro—Sheets. Republic Steel Corp., Cleveland, O.

Epo—Perforated Metals. Erdle Perforating Co., Rochester, N. Y.

EPCO—Welding Timer. Electronic Products Co., Geneva, Ill.

Era—Furnaces. Excelsior Steel Furnace Co., Chicago, Ill.

Era Exl-Air—Furnaces. Excelsior Steel Furnace Co., Chicago, Ill.

Easco—Smoke Pipe Dampers. Eselgroth & Co., Newark, N. J.

Esico—Electric Soldering Coppers. Electric Soldering Iron Co., Inc., Deep River, Conn.

Esico—Solder, Paint, Roofer Tools. Eastern States Supply Co., Brooklyn, N. Y.

Esso—Furnaces, Oil Burners. Gilbert & Barker Mfg. Co., West Springfield, Mass.

Eternium—Paint. Barrett Div., Allied Chemical & Die Corp., New York, N. Y.

Eureka—Furnaces. Home Stove Co., Indianapolis, Ind.

EutecRods—Welding Rods. Eutectic Welding Alloys Co., New York City.

EutecTodes—Electrodes. Eutectic Welding Alloys Co., New York City.

Evanair—Furnaces and Gas Heaters. Evanoll Div., Evans Products Co., Detroit, Mich.

Evansway—Furnaces. George Evans Corp., Moline, Ill.

Evco—Valves. Electric Valve Mfg. Co., New York, N. Y.

Evenheat—Damper Motors. Sampsell Time Control, Inc., Spring Valley, Ill.

Everdur—Plates, Sheets, Electrodes, Welding Rod. American Brass Co., Waterbury, Conn.

Everjet—Roofing Paint. Barrett Div., Allied Chemical & Die Corp., New York, N. Y.

Everwear—Eaves Trough and Gutters with Fittings, Ridge Rolls and Ridging, Roofing, Metal Shingles and Tile, Ventilators. Southern States Iron Roofing Co., Savannah, Ga.

Excelsior—Elbow Knife. C. DeWitt Wagner, Cedar Rapids, Ia.

Exidust—Dust Collectors. Allen Billmyre Co., Mamaroneck, N. Y.

Ex-L-ite—Sheets. Republic Steel Corporation, Cleveland, O.

E-Z-On—Damper Clips and Tips, and Damper Regulators. M. A. Gerett Co., Milwaukee, Wis.

Easy-Flu—Torch Formula Soldering Paste. L. B. Allen Co., Inc., Chicago, Ill.

F

F & D—Refractories. General Insulating Products Co., Brooklyn, N. Y.

F & E—Underfeed Stokers. Flynn & Emrich Co., Baltimore, Md.

F.M.D.—Solder. American Smelting & Refining Co., New York, N. Y.

Fabrikated—Faces, Grilles, Registers. Independent Register Co., Cleveland, O.

Faceweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Falco—Sheets. Fairmont Aluminum Co., Fairmont, W. Va.

Famous—Furnaces. Excelsior Steel Furnace Co., Chicago.

Famous Exl-Air—Air Conditioning Furnace. Excelsior Steel Furnace Co., Chicago, Ill.

Far-Air—Evaporative Coolers, Filters. Farr Co., Los Angeles, Calif.

Far-Air Rotary—Automatic Filters. Farr Co., Los Angeles, Calif.

Farco—Soldering Flux. Farrelloy Company, Inc., Philadelphia, Pa.

Far Quar—Furnaces. Farquhar Furnace Co., Wilmington, O.

Farsol—Soldering Flux. Farrelloy Co., Inc., Philadelphia.

Fastemp—Furnaces. Norge Heating & Cond. Div., Detroit, Mich.

Featherfin—Colls. L. J. Wing Mfg. Co., New York, N. Y.

Featherweight—Insulation. Keasbey & Mattison Co., Ambler, Pa.

Federal—Refractories. U. S. Stoneware Co., Akron, O.

F Electric—Fan Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Felt-Cote—Steel Roofing. American Steel Band Co., Pittsburgh, Pa.

Fenestra—Heat Insulating Windows. Detroit Steel Products Co., Detroit, Mich.

Fenn's Rotary—Roof Ventilators. Waverly Heating Supply Co., Boston, Mass.

Ferrobord—Steel Roofing. Truscon Steel Co., Youngstown, O.

Ferroclad—Building Insulation. Truscon Steel Co., Youngstown, O.

Ferrocrafft—Grilles. Tuttle & Bailey, Inc., New Britain, Conn.

Ferro-Therm—Insulation. American Flange & Mfg. Co., Inc., New York, N. Y.

Ferroweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Fiberglass—Insulation. Owens-Corning Fiberglass Corp., Toledo, O.

Fiberkote—Roof Cement. National Manufacturing Corp., Tonawanda, N. Y.

Fl-Blak—Insulation. Western Rock Wool Corp., Huntington, Ind.

Fibronized—Plastic Tubing. Irvington Varnish & Insulator Co., Irvington 11, N. J.

Filporise—Waterproofing Compounds. Eastern States Supply Co., Brooklyn, N. Y.

Filtered Aire—Blower-Filters. American Foundry & Furnace Co., Bloomington, Ill.

Findlay—Stokers. Central Rubber & Steel Corporation, Findlay, Ohio.

Fine Air—Air Conditioning Furnaces. Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit, Mich.

Fin-Flex—Directional Flow Registers. The Auer Register Co., Cleveland, O.

Fin-Line—Directional Flow Registers. The Auer Register Co., Cleveland, O.

Firebox—Combustion Chambers. Sld Harvey, Inc., Valley Stream, N. Y.

Firecrete — Refractories. Johns-Manville, New York, N. Y.

Firedaire — Circulating Heaters. Edwards Mfg. Co., Inc., Cincinnati, O.

Fire-Fixer — Firing Tools. Farrell-Cheek Steel Co., Sandusky, O.

Fire-Guard — Stokers. Peerless Mfg. Corp., Louisville, Ky.

Fire-Hearth — Castable Refractories. Fireline Stove & Furnace Lining Co., Chicago, Ill.

Fireite — Cement. Johns-Manville, New York, N. Y.

Fire-King — Stokers. Sinker-Davis Co., Indianapolis, Ind.

Fireline — Furnace Firepot Lining. Fireline Stove & Furnace Lining Co., Chicago 14, Ill.

Fire Pilot — Stoker Control. Sampsel Time Control, Inc., Spring Valley, Ill.

Fire Tender — Stokers. Holcomb & Hoke Mfg. Co., Indianapolis, Ind.

Firma — Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Fitrite — Conductor, Eaves Trough and Gutter Fittings and Accessories. Skylight Lifts, Snow Guards, Ventilators. David Levow, or Rival Strap Corp., New York, N. Y.

Fitzgibbonsaire — Air Conditioning Unit. Fitzgibbons Boiler Co., New York, N. Y.

Flakt — Cement. National Mfg. Corp., Tonawanda, N. Y.

Flash-Off No. 99 — Industrial Finish. Acme White Lead & Color Works, Detroit, Mich.

Flash-Rite — Flashings. The Figg Mfg. Co., Chicago, Ill.

Flatjet — Spray Nozzles. Spraying Systems Co., Chicago, Ill.

Flat-Top — Roofing. Globe Iron Roofing & Corrugating Co., Newport, Ky.

Fleetweld — Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Fleur de Lis — Conductor Heads and Fittings. Royal-Apex Mfg. Corp., Brooklyn, N. Y.

Flexaire — Registers and Grilles. Tuttle & Bailey, Inc., New Britain, Conn.

Flexarc — Arc Welders. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

"Flexibloc" — Paint. Samuel Cabot, Inc., Boston, Mass.

Flex-Tube — Draft Gauges. F. W. Dwyer Mfg. Co., Chicago, Ill.

Flo-Co — Furnaces. Floral City Co., Monroe, Mich.

Flocoy — Solder. Merchant & Evans Co., Philadelphia, Pa.

Floor-Aire — Floor Furnaces. L. J. Mueller Furnace Co., Milwaukee, Wis.

Flosoil — Flux. American Chemical Paint Co., Ambler, Pa.

Flo-Warm — Coal, Oil, Gas and Stoker-Fired Furnaces. Williamson Heater Co., Cincinnati, O.

Flualyzer — Portable CO₂ Analyzer. Chas. Engelhard, Inc., Newark, N. J.

Fluomaster — Chimney Furnace. Round Oak Co., Dowagiac, Mich.

Fluid Heat — Oil Burners, Furnaces, Water Heaters. Anchor Post Fence Co., Baltimore, Md.

Foamglas — Insulation. Pittsburgh Plate Glass Co., Pittsburgh.

Follanabee — Furnace Pipe. Sheet Metal Specialty Co., Pittsburgh, Pa.

Forbes Syphonaire — Ventilators. Western Engineering & Mfg. Co., Los Angeles, Calif.

Force-Flow — Water Circulating Pumps. Kehm Corp., Chicago.

Ford-V-Near — Building Insulation. Ford Roofing Products Co., Chicago, Ill.

Forest Fleece — Insulation. John J. Doehny Co., Belmont, Mass.

Forstair — Circulating Heaters. Pernot & Rich, Inc., Los Angeles, Calif.

Fosco — Skylights. F. O. Schoedinger, Columbus, O.

Foundation Coating — Waterproofing. Glidden Co., Cleveland, O.

Fractional Horsepower — V-Belts. B. F. Goodrich Co., Akron, O.

Fracto-Crete — Castable Refractory. Ramtite Co., Chicago.

Fransite — Enamels and Lacquers. Hilo Varnish Corp., Brooklyn, N. Y.

Free-Aire — Air Conditioning Units, Furnaces, Circulating Heaters. Kehm Corporation, Chicago.

Freeman — Stokers. Illinois Iron & Bolt Co., Chicago, Ill.

Freeport — Oil Burners. Holtum Mfg. Co., Freeport, Ill.

Friction Fighter — Bearings. Link-Belt Co., Chicago, Ill.

Frigid — Night Air Cooling and Exhaust Fans and Fan Blades. Circulators & Devices Mfg. Corp., New York, N. Y.

Front End — Paint. Barrett Div., Allied Chemical & Die Corp., New York, N. Y.

Fros-T-Aire — Air Conditioning Units. Palmers Manufacturing Corp., Phoenix, Ariz.

Frost-O-Lite — Paint. Sanvin Chemical Products Co., Moline, Ill.

Fuel-Door — Gas Burners. Handley Brown Heater Co., Jackson, Mich.

Fuel-Saver — Automatic Draft Regulator. Walker Mfg. & Sales Corp., St. Joseph, Mo.

Fulljet — Spray Nozzles. Spraying Systems Co., Chicago, Ill.

Fulscope — Controls. Taylor Instrument Companies, Rochester, N. Y.

Fulton — Copper Paint. Debevoise Co., Brooklyn, N. Y.

Fulton — Register Shield. Patent Novelty Co., Fulton, Ill.

Fyre-Chek — Draft Regulators. Wisconsin Heating & Draft Control Co., Appleton, Wis.

Fyre-Mortar — Insulating Cement. Quigley Company, Inc., New York, N. Y.

Fyr-Feeder — Stokers. American Coal Burner Company, Chicago, Ill.

Fyrgard — Doors. Richmond Fireproof Door Co., Richmond, Ind.

Fyrite — CO₂ Analyzers. Bacharach Industrial Instrument Co., Pittsburgh.

Fyr-Fly — Oil Burners. The Aldrich Co., Wyoming, Ill.

G

G. B. C. — Blowers and Fans. General Blower Co., Philadelphia, Pa.

G/C — Controls. General Controls Co., Glendale, Calif.

G-E — Air Conditioning Units, Oil Burners, Compressors, Controls, Soldering Coppers, Couplings, Electrodes, Fans, Flux, Furnaces, Humidistats, Motors, Relays, Switches, Transformers, Solenoid Valves, Thermostats, Welders. General Electric Co., Bloomfield, N. J., and Schenectady, N. Y.

G-M — Louvers, Shutters, Metal Stampings, Ventilators. Gillian Mfg. Co., Detroit, Mich.

G. R. — Air Conditioning Units. Window Ventilators and Filter Units. General Refrigeration Div. Yates-American Machine Co., Beloit, Wis.

Galbestos — Flashings and Roofing. H. H. Robertson Co., Pittsburgh.

Galvanide — Metal Protecting Paint. A. C. Horn Co., Long Island City, N. Y.

Galvaprep — Rust Preventive Chemicals. Nelson Chemical Co., Detroit, Mich.

Galv-O-Zinc — Coating, Paint. Blue Ridge Talc Co., Inc., Henry, Va.

Garland — Furnaces, Heaters. Detroit-Michigan Stove Co., Detroit, Mich.

Gas King — Furnaces. J. King Kent & Co., St. Louis, Mo.

Gas Miser — Furnaces. Floral City Co., Monroe, Mich.

Gastite — Furnaces. Waterman-Waterbury Co., Minneapolis, Minn.

Gasweld — Soldering Coppers, Torches, and Welding Equipment. Wall Chemicals Div., Liquid Carbonic Corp., Chicago.

Gem — Furnaces. Robinson Furnace Co., Chicago, Ill.

Gem — Soldering Furnaces. Burgess Soldering Furnace Co., Columbus, O.

Gemaco — Compressors. General Machinery Co., Spokane, Wash.

Gemware — Hygrometers, Psychrometers, Thermometers. G. M. Mfg. Co., New York, N. Y.

Gen-Arc — Arc Welders. General Equipment Co., Wichita, Kan.

General — Heaters. Agricola Furnace Co., Inc., Gadsden, Ala.

Generator — Colls. Hotstream Heater Co., Cleveland, O.

Gerotor — Fuel Oil Pump. May Oil Burner Corporation, Baltimore, Md.

Giant — Oil Burners. Aldrich Co., Wyoming, Ill.

Giant — Skylight Lifts. Danzer Metal Works Co., Hagerstown, Md.

Gibraltar — Furnace and Heaters. P. H. Magill Foundry & Furnace Works, Bloomington, Ill.

Gilbarco — Furnaces, Oil Burners. Gilbert & Barker Mfg. Co., West Springfield, Mass.

Gilco — Furnaces and Water Heaters. J. L. Gillen Co., Dowagiac, Mich.

Gilt Edge — Furnaces. Schwab Furnace Co., Milwaukee, Wis.

Glazola — Glazing Compounds. Nebel Mfg. Co., Cleveland, O.

Globe — Sheets. Newport Rolling Mill Co., Newport, Ky.

Globe — Ventilators. J. M. & L. A. Osborn Co., Cleveland, O.

Globe Sizer — Hot Water Colls. Globe Machinery & Supply Co., Des Moines, Ia.

Glo-Fyr — Oil Burners. Aldrich Co., Wyoming, Ill.

Glowan — Gas Burners. J. O. & C. U. Martin, San Francisco, Calif.

Gnome — Oil Burners. Aldrich Co., Wyoming, Ill.

Gohl — Eaves Trough & Gutters, Pipe, Ridge Rolls and Ridging, Roofing. Globe Iron Roofing & Corrugating Co., Newport, Ky.

Gohl — Sheets. Newport Rolling Mill Co., Newport, Ky.

Gold Bond — Insulation Board, Tile. National Gypsum Co., Buffalo, N. Y.

Gold Bond-Gimco — Rock Wool Products, Insulating Cement. National Gypsum Co., Buffalo, N. Y.

Golden Rod — Air Conditioning Units, Fans and Wheels, Blowers. Jaden Mfg. Co., Hastings, Nebr.

Gordon — Gas Conversion Burners. Roberts-Gordon Appliance Corp., Buffalo, N. Y.

Gradutrol — Controls. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Grand Rapids — Vacuum Furnace Cleaner. Doyle Vacuum Cleaner Co., Grand Rapids, Mich.

Graylite — Building and Duct Insulation, Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn.

Greastop — Filters. Air-Maze Corporation, Cleveland, O.

Grid — Heating and Cooling Colls. D. J. Murray Mfg. Co., Wausau, Wis.

Grillometer — Direct Reading Air Velocity Meter. Detroit Air Conditioning Service Co., Inc., Detroit, Mich.

Gross-Aire — Furnaces and Stokers. Grossenbacher Furnace Co., St. Louis, Mo.

Gurney—Furnaces. East Anaheim Sheet Metal Works, Long Beach, Calif.

Guthfan—Ventilating Fans. Edwin F. Guth Company, St. Louis.

H

H-B—Gas Conversion Burner. Handley Brown Heater Co., Jackson, Mich.

H&C—Registers. Hart & Cooley Mfg. Co., Holland, Mich.

H & K—Perforated Metals. Harrington & King Perforating Co., Chicago, Ill.

Hair-Boston—Insulation. Wilson & Co., Inc., Chicago, Ill.

Haircraft—Insulation. Wilson & Co., Inc., Chicago, Ill.

Hair Glass—Filters. H. J. Somers, Inc., Detroit, Mich.

Hammerkraft—Enamels and Lacquers. Hilo Varnish Corp., Brooklyn, N. Y.

Hammer-Sets—Expansion Bolts. Rawlplug Co., Inc., New York, N. Y.

Handnib—Punches. National Machine Tool Co., Racine, Wis.

Handy—Pipe, Prefabricated Ducts and Fittings. F. Meyer & Bro. Co., Peoria, Ill.

Handy-Andy—Clinker Tong. Northwestern Stove Repair Co., Chicago, Ill.

Handy Change—Arc Welders. Maple Valley Mfg. Co., Mapleton, Iowa.

Handy-Flux—Soldering Flux. Handy & Harman, New York, N. Y.

Happy Thought—Heaters. Pittston Stove Co., Pittston, Pa.

Hardweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Health-Air—Window Ventilator-Filters. Reliable Sheet Metal Engineering Co., Chicago, Ill.

Health-aire—Blower, Colls, Fans, Louvers and Shutters and Ventilators. Johnson Fan & Blower Corp., Chicago, Ill.

Hearth—Refractories. Refractory & Insulation Corporation, New York, N. Y.

Heat-Aid—Furnace Linings. Pyrolite Products Co., Cleveland, Ohio.

Heat Booster—Warm Air Booster Fans. Victor Electric Products, Inc., Cincinnati, Ohio.

Heat Breaker—Fans. Warren Earl Company, Houston, Tex.

Heat Check—Insulating Cement. Refractory & Insulation Corp., New York City.

Heat Holder—Baffles. Sid Harvey, Inc., Valley Stream, N. Y.

Heat Hustler—Booster Fans. American Foundry & Furnace Co., Bloomington, Ill.

Heat-O-Meter—Controls. Miller Heat-O-Meter Co., Milwaukee.

Heat-Pak—Oil Burners. Aldrich Co., Wyoming, Ill.

Heat Proof—Paint. Glidden Co., Cleveland, O.

Heat-Rite—Gravity Registers. Auer Register Co., Cleveland, O.

Heatrola—Heaters. Estate Stove Co., Hamilton, O.

Heatseal—Insulation. Ehret Magnesia Mfg. Co., Valley Forge, Pa.

Heatwave—Heaters. Day & Night Mfg. Co., Monrovia, Cal.

Heavyduty—Damper Quadrants. Parker-Kalon Corp., New York, N. Y.

Heat-Master—Kettles. Aeroll Burner Co., Inc., West New York, N. J.

Hellite—Refractories. Johns-Manville, New York, N. Y.

Helyx—Drive Screws, Nails. Hillwood Manufacturing Co., Cleveland, O.

Herco—Welders, Transformers. Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.

Hercules—Furnaces. Johnston Gas Furnace Corp., North Hollywood, Calif.

Hercules—Gravity Roof Ventilators. Berger Bros. Co., Philadelphia, Pa.

Heresite—Pipe and Fittings. Heremetal Co., Minneapolis, Minn.

Hermette—Furnaces. Favorite Mfg. Co., Piqua, Ohio.

Hero—Heaters. J. V. Patten Co., Sycamore, Ill.

Hev-E-Oil—Oil Burners. Sanmyer Corp., Chicago, Ill.

Hevikont—Electrodes. Universal Power Corporation, Cleveland, Ohio.

Hexagonal Mesh—Wire Glass. Mississippi Glass Co., New York, N. Y.

Hi-Boy—Furnaces. Aladdin Heating Corp., Oakland, Calif.

HiBoy—Furnaces. Dowaglac Steel Furnace Co., Dowaglac, Mich.

Hicycle—Electric Tools. Chicago Pneumatic Tool Co., New York, N. Y.

Hi-Degree Gray Coating—Paint. Cheesman-Elliott Co., Inc., Brooklyn, N. Y.

High-Ten- No. 500—Solder. Industrial Service Laboratories, Milwaukee, Wis.

Highway—Copper Iron. Apollo Steel Co., Apollo, Pa.

Hi Heat—Enamels and Lacquers. Aluminum Paint. J. H. Krehbiel Co., Chicago, Ill.

Hi-Heat Gray—Paint. Walles Dove-Hermiston Corporation, Westfield, N. J.

Hi-Lo—Variable Speed Pulleys. Equipment Engineering Co., Minneapolis, Minn.

Hilo Spatter—Enamels and Lacquers. Hilo Varnish Corp., Brooklyn, N. Y.

Hilume—Aluminum Paint. Hilo Varnish Corp., Brooklyn, N. Y.

Hinman—Angle Benders. L. R. Evans Machine Co., Sandwich, Ill.

Hi-Speed—Nibbler and Shears. Libert Machine Co., Green Bay, Wis.

Hi-Spra—Spray Nozzles. Thermal Industries, Indio, Calif.

Hi-Temp—Insulating Cement. B. F. Nelson Mfg. Co., Minneapolis, Minn.

Hi-Test—Safety Glass. Libbey-Owens-Ford Glass Co., Toledo, Ohio.

Hitoneast—Grilles. Tuttle & Bailey, Inc., New Britain, Conn.

Hoal—Louvered Ventilators. American Sheet Metal Works, New Orleans, La.

Hoffman—Oil Burners. Shedlov Oil Burners, Inc., Minneapolis, Minn.

Hold Heat—Soldering Coppers. Turner Brass Works, Sycamore, Ill.

Holgun—Portable Electric Drills. Black & Decker Mfg. Co., Towson, Md.

Holtite—Screws. Continental Screw Co., New Bedford, Mass.

Home—Furnaces. Rock Island Stove Co., Rock Island, Ill.

Home Comfort—Blowers, Furnaces. St. Louis Furnace Mfg. Co., St. Louis, Mo.

Horneblende—Metal Protecting Paint. North American Fibre Products Co., Cleveland, Ohio.

Hot Blast—Furnaces and Heaters. Cole Hot Blast Mfg. Co., Chicago, Ill.

Hot Blast—Soldering Furnaces and Torches. Turner Brass Works, Sycamore, Ill.

Hoteo—Furnaces, Oil Burners. Hotentot Co., Inc., Omaha, Nebr.

Hot Spot—Electric Welders. Acme Electric Welder Co., Los Angeles, Calif.

Hot Wave—Coils. Rudy Furnace Co., Dowaglac, Mich.

Howie—Heat Savers. Condensation Engineering Corp., Chicago, Ill.

Hoyt—Lead Roofing. National Lead Co., New York, N. Y.

Huber—Overfeed Stokers. Flynn & Emrich Co., Baltimore, Md.

Humidair—Humidifiers. Skilbeck Mfg. Co., Kenosha, Wis.

Humidair—Washers. American Foundry & Furnace Co., Bloomington, Ill.

Humidigraph—Hygrometers. Bristol Company, Waterbury, Conn.

Humidiguide—Hygrometer. Taylor Instrument Companies, Rochester, N. Y.

Humidostat—Humidistats. Johnson Service Co., Milwaukee, Wis.

Humiduct—Humidifiers. Bahnson Co., Winston-Salem, N. C.

Humphrey—Furnaces and Heaters. General Gas Light Co., Kalamazoo, Mich.

Hycarb—Electrodes. Universal Power Corporation, Cleveland, O.

Hydra—Valves. Albright Equipment Co., Johnstown, Pa.

Hydraulic-Action—Controls. White-Rodgers Electric Co., St. Louis, Mo.

Hydro-Aire—Air Conditioners. Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.

Hydrocide—Compounds, Waterproofing. L. Sonneborn Sons, Inc., New York, N. Y.

Hydro-Clone—Blowpipe Collectors and Fume Exhausters. Whiting Corporation, Harvey, Ill.

Hydronon—Concrete Waterproofing Paint. Barrett Div., Allied Chemical & Die Corp., New York, N. Y.

Hydro-Proof—Water-Proofing Compounds. Asphalt Products Co., Syracuse, N. Y.

Hydro-Whirl—Dust Collectors. Peters-Dalton, Inc., Detroit, Mich.

Hy-Duty—Blades, Fans, Blowers, Housings, Pumps, Ventilators, Wheels. Schwitzer-Cummins Co., Indianapolis, Ind.

Hy-Power—Snips and Shears. Wiss & Sons Co., J., Newark, N. J.

Hyspar—Roof Cement, Compounds, Paint. Midland Paint & Varnish Co., Cleveland, O.

Hy-Speed—Hydraulic Tools. Reimüller Brothers Company, Franklin Park, Ill.

Hytemp—Insulation. Keasbey & Mattison Company, Ambler, Pa.

Hytemplate—Furnace Cement. Quigley Company, Inc., New York, N. Y.

Hytest—Paint. National Mfg. Co., Tonawanda, N. Y.

IEC—Relays, Switches. Industrial Engineering Corp., Terre Haute, Ind.

Ice-O-Matic—Compressors. Williams Oil-O-Matic Heating Corp., Bloomington, Ill.

Idal—Furnace Brushes. Worcester Brush & Scraper Co., Worcester, Mass.

Idal—Roofing Nails. Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Idal (Air Cell)—Insulation. Hinde & Dauch Paper Co., Sandusky, Ohio.

Ilgair—Fans. Ilg Electric Ventilating Co., Chicago, Ill.

Ilgette—Kitchen Exhaust Fans. Ilg Electric Ventilating Co., Chicago, Ill.

Impact—Spray Nozzles. Phillips Cooling Tower Co., Inc., New York, N. Y.

In-Bilt—Kitchen Exhaust Fans. Victor Electric Products, Inc., Cincinnati, O.

Inco—Paint. Inter-Coastal Paint Co., East St. Louis, Ill.

Inco—Nickel Alloys and Welding Rod, Sheets. International Nickel Co., Inc., New York, N. Y.

Inconel—Alloy Plates, Sheet, Tubing. International Nickel Company, Inc., New York, N. Y.

Independent—Furnaces. Independence Stove & Furnace Co., Independence, Mo.

Indian—Furnaces. Dowagiac Steel Furnace Co., Dowagiac, Mich.

Ingaletad—Plates and Sheets. Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago, Ill.

Ingot Iron—Sheets, Ridge Rolls and Ridging. American Rolling Mill Co., Middletown, Ohio.

Inkstop—Filters. Air-Maze Corporation, Cleveland, O.

Inna-Lute—Insulating Cement. Sauer-eisen Cements Co., Pittsburgh, Pa.

Inna-Lite—Building and Duct Insulation. Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn.

Insola—Metal Protecting Paint. Acorn Refining Co., Cleveland, O.

Insulag—Insulation and Insulating Cement. Quigley Co., Inc., New York, N. Y.

Insulate-Windows—Heat Insulating Windows. Chamberlin Metal Weather Strip Co., Inc., Detroit, Mich.

Insulbiox—Insulation. Quigley Co., Inc., New York, N. Y.

Insulbrick—Insulation. Quigley Co., Inc., New York, N. Y.

Insulcrete—Insulation. Quigley Co., Inc., New York, N. Y.

Insulduct—Prefabricated Ducts. Smith-Raymond Co., Columbus, Ga.

Insulfil—Insulation. Refractory & Insulation Corp., New York, N. Y.

Insulmat—Insulation. J. W. Mortell Co., Kankakee, Ill.

Interlock—Pipe. Milcor Steel Co., Milwaukee, Wis.

Interlox—Plastic Tee. Extruded Plastics, Inc., Norwalk, Conn.

Inter-Matic—Time Switches. International Register Co., Chicago.

Ionaire—Ozone Apparatus. Electroaire Corp., Chicago.

Ironhide—Paint. Pittsburgh Plate Glass Co., Pittsburgh.

Ironite—Hot Surface Paint. Acorn Refining Co., Cleveland, O.

Ironlung—Ventilators. Powermatic Ventilator Company, Cleveland.

Ironset—Asbestos Furnace Cement. Fireline Stove & Furnace Lining Co., Chicago, Ill.

Ironsides—Paint. Thompson & Co., Pittsburgh, Pa.

Irope—Rust-Proofing. Wolfe-Kote Co., Sheboygan, Wis.

Isl City—Registers. Rock Island Register Co., Rock Island, Ill.

Iso-Tem—Automatic Heat Control. Tem Products Co., Midland, Pa.

Ivanhoe—Heaters. Perfection Stove Co., Inc., Cleveland, O.

J

J & C—Blowers, Oil Burners, Furnaces. Jackson & Church Co., Saginaw, Mich.

J-M—Insulation, Roofing. Johns-Manville, New York, N. Y.

Jack Frost—Insulation. Barrett Div., Allied Chemical & Die Corp., New York, N. Y.

Janitrol—A. C. Units, Gas Burners, Furnaces. Surface Combustion, Toledo, O.

Jennings—Pumps. Nash Engineering Co., South Norwalk, Conn.

Jet-Cote—Roof Cement. Acme White Lead & Color Works, Detroit, Mich.

Jet-Lastic—Roof Cement. Acme White Lead & Color Works, Detroit, Mich.

Jet-O-Matic—Water Circulating Pumps. Gould Pumps Inc., Seneca Falls, N. Y.

Jewel—Furnaces, Heaters. Detroit-Michigan Stove Co., Detroit, Mich.

Jifree—Colls. Hotstream Heater Co., Cleveland, O.

Jiffy—Regulator Set. Parker-Kalon Corp., New York, N. Y.

Julian d'Este—Gas Pressure Valves. Reading-Pratt & Cady Div., American Chain & Cable Co., Reading, Pa.

Jumbo—Oil Burners. The Aldrich Co., Wyoming, Ill.

June-Aire—Furnaces. American Foundry & Furn. Co., Bloomington, Ill.

Junista—Soldering Flux. Geo. W. Diener Mfg. Co., Chicago, Ill.

JusRite—Ducts and Furnace Pipe and Fittings. Corbman Bros., Inc., Philadelphia, Pa.

JusRite L-Bo—Furnace Pipe and Fittings. Corbman Bros., Inc., Philadelphia, Pa.

K

K-B—Damper Clips, Tips and Regulator Sets. G. L. Kerentoff, Cincinnati, Ohio.

KCB—Sheets. Newport Rolling Mill Co., Newport, Ky.

KCB—Eaves Trough and Gutters, Pipe, Ridge Rolls and Ridging, Roofing. Globe Iron Roofing & Corrugating Co., Newport, Ky.

K&M—Damper Regulator, Valves. Kieley & Mueller, Inc., North Bergen, N. J.

K&M—Insulation. Keasbey & Mattison Co., Ambler, Pa.

K&M Duplex—Insulation. Keasbey & Mattison Co., Ambler, Pa.

K&M Hy-Temp—Insulation. Keasbey & Mattison Co., Ambler, Pa.

K&M Simplex—Insulation. Keasbey & Mattison Co., Ambler, Pa.

KO—Oil Burning Water Heaters. Automatic Humidifier Co., Cedar Falls, Iowa.

K.S.V.—Ventilators. Kernchen Co., Chicago, Ill.

Kant Krush—Roof Strainers, Grand Rapids Wire Products Co., Grand Rapids, Mich.

Karatex—Insulation. Blocksom & Company, Michigan City, Ind.

Kast-O-Lite—Refractories. A. P. Green Fire Brick Co., Mexico, Mo.

Kathabar—A. C. Units. Surface Combustion, Toledo, O.

Kathode—Electrodes. Lincoln Electric Co., Cleveland, O.

Kauklt—Caulking Compound. L. Sonneborn Sons Inc., New York, N. Y.

Kelsey-Bradley—Furnaces, Kelsey Heating Co., Inc., Syracuse, N. Y.

Kemick—Paint. American Chemical Paint Co., Ambler, Pa.

Ken—Flue Gas Analyzers, Anemometers, Baffles, Combustion Chambers, Controls, Humidifiers, Damper Motors, Thermometers and Valves. Barclay Inc., Robert, Chicago, Ill.

Kent Concrete Coating—Concrete Waterproofing Paint. Cheesman-Elliott Co., Inc., Brooklyn.

Keystone—Heaters. J. V. Patten Co., Sycamore, Ill.

Kimsul—Insulation. Kimberly-Clark Corp., Neenah, Wis.

Kleen-Air—Filters. Kaye & MacDonald, Inc., West Orange, N. J.

Kleensho—Filters. Air-Maze Corp., Cleveland, O.

Klenk's Aviation—Snips. Reiner & Campbell Co., Inc., Elizabeth, N. J.

Klixon—Controls, Switches, Humidistats, Motors, Relays, Switches, Thermostats. Spencer, Thermostat Co., Attleboro, Mass.

Klondike—Welders. Ralph Fern, Scranton, Pa.

Knight-Ware—Prefabricated Ducts and Fittings. Maurice A. Knight, Akron, O.

Knock-Out—Arc Welders, Buffers, Grinders, Polishers and Sanders. K. O. Lee & Son Co., Aberdeen, S. D.

Kno-Draft—High Velocity Air Diffusers. W. B. Connor Eng. Corp., Dorex Div., New York, N. Y.

Kold-Aire—Air Conditioning Units. U. S. Air Conditioning Corp., Minneapolis, Minn.

Kolostat—Furnace Draft Regulator. P. C. Timm & Son, Lincoln, Neb.

Kolstoker—Stokers. Anchor Stove & Range Co., New Albany, Ind.

Konical—Ventilators. Milcor Steel Co., Milwaukee, Wis.

Kooler-Aire—Air Conditioning Units. U. S. Air Conditioning Corp., Minneapolis, Minn.

Koolshade—Sun Reflecting Screens. Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.

Koolstack—Furnaces. Leader Iron Works, Inc., Decatur, Ill.

Koppax—Paint. Koppers Co., Inc., Pittsburgh, Pa.

Korolax RX—Metal Protective Coatings. B. F. Goodrich Co., Akron, O.

Koroseal—Plastic. B. F. Goodrich Co., Akron, O.

Koroseal Tape RX—Protective Coatings. B. F. Goodrich Co., Akron, O.

Kristokrak—Enamels and Lacquers. Zapon Division Atlas Powder Co., North Chicago, Ill.

Krome-Kote—Welding Compound. Wolfe-Kote Co., Sheboygan, Wis.

Kumfort Cooler—Evaporative Coolers. Utility Appliance Corporation, Los Angeles, Calif.

Kwik-Way—Ladder Brackets. Myers Ladder Equipment Co., Madison, Wis.

L

L. A.—Motors. Louis Allis Co., Milwaukee, Wis.

L-M—Tubing. Lewin-Mathes Co., St. Louis, Mo.

L & N—Instruments. Leeds & Northrup Co., Philadelphia, Pa.

LP—Ducts, Fittings, Grilles, Pipe, Registers and Ventilators. Lamneck Products, Inc., Middletown, O.

L & R—Conductor Pipe. Lamb & Ritchie Co., Cambridge, Mass.

L-R—Flexible Couplings. Lovejoy Flexible Coupling Co., Chicago, Ill.

L-U—Gravity Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Lacq—Lacquers. Glidden Company, Cleveland, O.

Lakeside—Blowers. Furblo Co., Hermansville, Mich.

Lancel—Stainless Steel Soldering Flux. F. H. Langsenkamp Co., Indianapolis, Ind.

Larco—Mineral Paste. Western Mineral Products Co., Omaha, Nebr.

Lastik Wampum—Cement Paint. Lastik Products Co., Inc., Pittsburgh, Pa.

Latent—Skylight Lifts. Danzer Metal Works Co., Hagerstown, Md.

Lender—Oil Burners and Circulating Heaters. Victor Oil Burner Mfg. Co., Hartford, Conn.

Lead-Hend—Nails. W. H. Maze Co., Peru, Ill.

Lead-Seal—Roofing Nails. The Deniston Co., Chicago, Ill.

Lead-Sealed—Sheets. Continental Steel Corp., Kokomo, Ind.

Leadtex—Lead-Coated Sheets. Revere Copper and Brass Incorporated, New York, N. Y.

Lectro-Glo—Heaters and Furnaces. Day & Night Mfg. Co., Monrovia, Cal.

Lectro-Shear—Portable Electric Shears. Black & Decker Mfg. Co., Towson, Md.

Ledaloil—Sleeve Bearings. Johnson Bronze Co., New Castle, Pa.

Lehigh—Furnaces, Heaters. Pittston Stove Co., Pittston, Pa.

Leonard—Circulating Oil Heater. W. R. Ames Co., San Francisco, Calif.

LeRoy—Fan and Gravity Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Liberty—Heaters. Day & Night Mfg. Co., Monrovia, Cal.

Liberty—Paint. Carter Paint Co., Liberty, Ind.

Liberty—Ventilators. Penn Ventilating Company, Philadelphia, Pa.

Lifetime—Furnaces. Hart & Crouse Corp., Utica, N. Y.

Lifetime—Furnace Pipe Fittings & Accessories. Campbell Heating Co., Des Moines, Ia.

Lightweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Line-Inductor—Electrodes. Lincoln Electric Co., Cleveland.

Lincoln—Furnaces, Heaters. American Foundry & Furnace Co., Bloomington, Ill.

Lincolntrol—Foot-Operated Welding Control. Lincoln Electric Co., Cleveland.

Lincolnweld—Arc Welders, Electrodes. The Lincoln Electric Co., Cleveland, O.

Linseal—Furnace Cement. Buckeye Products Co., Cincinnati, O.

Linestart—Motors. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Lipman—Coils, Compressors. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.

Liquid Elastigum—Paint and Roofing Cement. Barrett Div., Allied Chemical & Die Corp., New York, N. Y.

Lithoform—Metal Protecting Paint. American Chemical Paint Co., Ambler, Pa.

Little Blacksmith—Punches and Slitting Machines. J. F. Kidder Mfg. Co., Inc., Burlington, Vt.

Little Bobby—Bending Brakes. A. R. Harris, Hammond, Ind.

Little Giant—Time Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.

Llenroe—Fire Doors. Cornell Iron Works, Inc., Long Island City, N. Y.

Lloyd's—Stainless Soldering Flux. Lloyd S. Johnson Co., Chicago, Ill.

Lloyd's No. 7—Silver Solder Flux. Lloyd S. Johnson Co., Chicago, Ill.

Lo-Blast—Gas Conversion Burners. National Machine Gas Burner Div., Mid-Continental Metal Products Co., Chicago.

Lo-Hoy—Stokers. Whiting Corp., Harvey, Ill.

Locarb—Electrodes. Universal Power Corporation, Cleveland, O.

Lochinvar—Furnaces and Water Heaters. Michigan Tank & Furnace Corp., Lochinvar Prod. Div., Detroit, Mich.

Lockaire—Insulation Board. Plastergon Wall Board Co., Buffalo, N. Y.

Lock-Joint—Pipe and Pipe Fittings and Accessories. Milcor Steel Co., Milwaukee, Wis.

Locktite—Damper Regulators. Ohio Products Co., Cleveland, O.

Lok-Joint—Insulating Lath. Insulite Div. Minnesota & Ontario Paper Co., Minneapolis, Minn.

LoMaintenance—Electric Motors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Lornate—Chimney Caps & Tops, Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Lowdensite—Insulation. Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn.

Luce—Acid Brushes, Compounds, Flux, Solder. Thos. F. Lukens Metal Co., Philadelphia, Pa.

Lume-Tex—Aluminum Paint. Truscon Laboratories, Detroit.

Luminare—Electrodes. Universal Power Corporation, Cleveland, O.

Lumino—Paint. Koppers Co., Inc., Pittsburgh, Pa.

Lumitall—Aluminum Paint. National Mfg. Co., Tonawanda, N. Y.

Lustralumin—Aluminum Paint. Blue Ridge Talc Co., Inc., Henry, Va.

Luxaire—Blower-Filters, Furnaces and Humidifiers, Pipe. The C. A. Olsen Manufacturing Co., Elyria, O.

Lyonore—Sheets. Lyon-Conklin & Co., Inc., Baltimore, Md.

Lystron—Soldering Flux. Farrelloy Co., Inc., Philadelphia.

Lytestone—Soldering Flux. Farrelloy Company, Inc., Philadelphia, Pa.

M

M. E.—Motors. Marathon Electric Mfg. Corp., Wausau, Wis.

M & E—Compressors, Solder. Merchant & Evans Co., Philadelphia, Pa.

M.F.C.—Gas Floor Furnaces. Moncrief Furnace & Mfg. Co., Inc., Dallas, Tex.

M-H—Controls. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

M & H—Zinc Sheets. Matthiessen & Hegeler Zinc Co., LaSalle, Ill.

M & M—Humidifiers and Fittings, Nozzles, Switches and Valves. McDonnell & Miller, Chicago, Ill.

M & S—Cork Insulation. Mitchell & Smith, Inc., Toledo, O.

M-VB—Fittings, Valves. Scovill Mfg. Co., Morency-Van Buren Div., Sturgis, Mich.

M/W—Filters. American Air Filter Co., Inc., Louisville, Ky.

Macheta—Fans and Fan Blades, Ventilators. Aerovent Fan Co., Piqua, O.

Mack—Heaters. J. V. Patten Co., Sycamore, Ill.

Magie Dial—Thermostats. Perfex Corporation, Milwaukee, Wis.

Magie Spray—Oil Burners. Conco Div., H. D. Conkey & Co., Mendota, Ill.

Magic Weather—Air Conditioners, Blowers and Air Washers. Ballantyne Co., Omaha, Neb.

Majestic—Roofing, Skylights, Ventilators. W. A. Fingles, Inc., Baltimore, Md.

Mallidril—Electric Drills. Mall Tool Co., Chicago.

Mammoth—Furnaces. Stainless & Steel Products Co., Saint Paul, Minn.

Manganend—Electrodes. Arcos Corporation, Philadelphia, Pa.

Manganed-Phospholene No. 7—Rust Preventative. Western Reserve Laboratories, Cleveland.

Manganweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Marietta—Enamels and Lacquers. American-Marietta Co., Chicago, Ill.

Mark Time—Relays, Time Switches. M. H. Rhodes, Inc., Hartford, Conn.

Marlox—Metal Protecting Paints. Marley Chemical Co., Detroit, Mich.

Mars—Furnaces. Pacific Gas Heating Co., San Francisco, Calif.

Marsh Jacuzzi—Pumps. American-Marsh Pumps, Inc., Grand Rapids, Mich.

Marvel—Punches. Armstrong-Blum Mfg. Co., Chicago, Ill.

Maseo—Combustion Chambers. Munn and Steele, Inc., Newark, N. J.

Maseobond—Furnace Cement and Insulation. Munn and Steele, Inc., Newark, N. J.

Mascote—Insulating Cement and Duct Insulation. Munn and Steele, Inc., Newark, N. J.

Massachusetts—Blowers, Fans. Bishop & Babcock Mfg. Co., Cleveland, O.

Master—Built-Up Roofing. B. F. Nelson Mfg. Co., Minneapolis, Minn.

Master—Controls, Pulleys, Thermostats. White Mfg. Co., St. Paul, Minn.

Master—Air Conditioning Furnaces. Premier Furnace Co., Dowagiac, Mich.

Master—Hangers and Fittings. Royal-Apex Mfg. Corp., Brooklyn, N. Y.

Master—Stokers. Muncie Gear Works, Inc., Muncie, Ind.

Master Blowerrol—Thermostatic Hydraulic Control. White Mfg. Co., Minneapolis, Minn.

Masterfil—Insulation. B. F. Nelson Mfg. Co., Minneapolis, Minn.

Master Kraft—Furnaces, Coils, Oil Burners and Heat Savers. Harvey-Whipple, Inc., Springfield, Mass.

Master Line—Soldering Torches. Turner Brass Works, Sycamore, Ill.

Mastr-Lok—Pipe Fittings. Parkersburg Iron & Steel Co., Parkersburg, W. Va.

Max-I-min—Furnaces. The Gehrl Co., Tacoma, Wash.

Mayari R—Nickel-Chromium Sheets and Plates. Bethlehem Steel Co., Bethlehem, Pa.

Maya Air—Dampers. Controlair, Inc., Elyria, O.

Meeco—Doors and Shutters, Skylights, Ventilators. Moeschel-Edwards Co., Inc., Cincinnati, O.

Meeco—Gas Welding Rod, Torches. Modern Engineering Co., St. Louis, Mo.

Meeco Jiffy—Soldering Torches. Modern Engineering Co., St. Louis, Mo.

Mel-Rock—Fan-Filters, Ventilators and Washers. Mellish & Murray Co., Chicago, Ill.

Metalestos—Pipe and Fittings. Williams-Wallace Co., San Francisco, Calif.

Metal-Coat—Copper Paint. J. W. Stokes, Jr., Brooklyn, N. Y.

Metalized Primer Spray—Midland Paint & Varnish Co., Cleveland, O.

Metallite—Paint. Glidden Company, Cleveland, O.

Metal-Master—Snips and Shears. J. Wiss & Sons Co., Newark, N. J.

Metalprep—Rust Preventative Chemicals. Neilson Chemical Co., Detroit, Mich.

Metaphram—Draft Regulator. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Metrotherm—Thermostats. General Controls Co., Glendale, Calif.

Meyco—Furnaces. Meyer Furnace Co., Peoria, Ill.

Micromax—Hygrometers and Recorders. Leeds & Northrup Co., Philadelphia, Pa.

Microtrol—Damper Motors. Barber-Colman Co., Rockford, Ill.

Microtherm—Thermostats. Barber-Colman Co., Rockford, Ill.

Micro-Turret—Punches. Wiedemann Machine Co., Philadelphia, Pa.

Micro-Weld—Spot Welders. Micro Products Co., Chicago, Ill.

Midget—Bending Brake. A. R. Harris, Hammond, Ind.

Midget—Damper Regulators. Ohio Products Co., Cleveland, O.

Midget—Valves. Mald-O'-Mist, Inc., Chicago, Ill.

Midget Kooler-aire—Air Conditioning Units. U. S. Air Conditioning Corp., Minneapolis, Minn.

Mighty Midget—Furnaces. Dowagiac Steel Furnace Company, Dowagiac, Mich.

Mighty Midget—Furnaces. Floral City Company, Monroe, Mich.

Mighty Midget Unishear—Shears. Stanley Works, New Britain, Conn.

Mildaire—Furnaces. Parker Heating & Mfg. Co., St. Petersburg, Fla.

Milwaukee—Ventilators. Milcor Steel Co., Milwaukee, Wis.

Mineral Wool Board—Insulation. Armstrong Cork Company, Lancaster, Pa.

Minfelt—Insulating Cement, Insulation. Mitchell & Smith, Inc., Toledo, O.

Minnemeyer—Fittings. LaCrosse Steel Roofing & Corrugating Co., LaCrosse, Wis.

Minute—Damper Regulator Sets. Joal Mfg. Corp., Toledo, O.

Miracle-Air—Window Ventilators. Reliable Sheet Metal Engineering Co., Chicago, Ill.

Mirro-Matic—Water Heaters. Handley Brown Heater Co., Jackson, Mich.

Mirro-Shell—Water Heaters. Handley Brown Heater Co., Jackson, Mich.

Misco—Wire Glass. Mississippi Glass Company, New York, N. Y.

Missing Link—Arc Welder Attachment. Mid-States Equipment Co., Chicago.

Missouri Flint—Fire Brick. Chicago Fire Brick Co., Chicago, Ill.

Mistoll—Oil Burners. Wayne Oil Burner Corp., Fort Wayne, Ind.

Mixend—Electrodes. Arcos Corp., Philadelphia, Pa.

Model—Furnaces, Heaters. Home Stove Co., Indianapolis, Ind.

Modernair—Blower-Filter Units. Payne Furnace & Supply Co., Beverly Hills, Calif.

Modernaire—Furnaces, Humidifiers. Des Moines Stove Repair Co., Des Moines, Ia.

Modernaire—Air Conditioning Units, Fans. Dallas Eng. Co., Inc., Dallas, Tex.

Modern Console—Heaters. Payne Furnace & Supply Co., Inc., Beverly Hills, Calif.

Moderne-Air—Furnaces, Blowers. Agricola Furnace Co., Gadsden, Ala.

Moderne—Blowers, Furnaces. Agricola Furnace Co., Inc., Gadsden, Ala.

Modernistic—Heaters. Agricola Furnace Co., Inc., Gadsden, Ala.

Moduflow—Sectional Controls. Minneapolis-Honeywell Regulator Co., Minneapolis.

Modutrol—Damper Duct Motors and Fan Controls. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Mogul—Rust Preventive Chemicals. North American Fibre Products Co., Cleveland, O.

Molditt—Refractories. Refractory & Insulation Corp., New York, N. Y.

Moler—Insulation. F. L. Smith & Co., New York, N. Y.

Monarch—Furnaces. Forest City Foundries Co., Cleveland, O.

Monerief—Furnaces. Henry Furnace Company, Medina, O.

Monel—Sheets, Plate and Tubing. International Nickel Co., Inc., New York, N. Y.

Monitor—Furnaces. Marshall Furnace Co., Marshall, Mich.

Monmouth—Humidifiers. Cleveland Humidifier Co., Cleveland.

Monogram—Furnaces. Quincy Stove Mfg. Co., Quincy, Ill.

Mono-Line—Duct Insulation. Quigley Company, Inc., New York, N. Y.

Monovent—Ridge Ventilators. Burt Mfg. Co., Akron, O.

Monsoon—Louvers and Shutters. Jamieson Mfg. Co., Dallas, Tex.

Morfex—Flexible Couplings. Morse Chain Co., Ithaca, N. Y.

Mer-Mac—Furnaces. Morrison Steel Products, Inc., Buffalo, N. Y.

Morning Air—Furnaces. Jackson Sheet Metal Wks., Ogden, Utah.

Mer-Sun—Furnaces. Morrison Steel Products, Inc., Buffalo.

Mortex—Metal Protective Coatings. J. W. Mortell Co., Kankakee, Ill.

Mortite—Caulking and Glazing Compounds, Roofing Paint. J. W. Mortell Co., Kankakee, Ill.

Moto-Heat—Oil Burners. Brigham Oil Burner Co., St. Louis, Mo.

Motopump—Water Circulating Pumps. Yeomans Bros. Co., Chicago, Ill.

Motorlay—Contact Device. Barber-Colman Co., Rockford, Ill.

Motorized Draft-O-Stat—Controls. Hotstream Heater Co., Cleveland.

Motorstoker—Stokers. Hershey Machine & Foundry Co., Mannheim, Pa.

Mototurb—Ventilators. Uno Ventilator Co., Cliftondale, Mass.

Moyno—Pumps. Robbins & Myers, Inc., Springfield, O.

Mule-Hide—Cement, Caulking Compounds, Paint and Roofing. Lehon Company, Chicago, Ill.

Multiblade—Welding Fume Exhausters. General Blower Co., Chicago.

Multiclone—Collectors. Western Precipitation Corp., Los Angeles, Calif.

Multi-Duty—Filters. American Air Filter Co., Inc., Louisville, Ky.

Multi-Flanger—Flanging Machine. Riverside Machinery Co., Chicago.

Multiple Star—System of Welding. Electric Arc, Inc., Newark, N. J.

Multitherm—Air Conditioning Units. Clavage Fan Co., Kalamazoo, Mich.

Multi-V—Belts. B. F. Goodrich Co., Akron, O.

Multi-V-Type—Filters. Dollinger Corporation, Rochester, N. Y.

Multivane—Blowers. B. F. Sturtevant Co., Hyde Park, Boston, Mass.

Multi-Zone—Conditioners. Michell Air Conditioning Co., Inc., Schenectady, N. Y.

Murex—Arc Welding Electrodes. Metal & Thermit Corp., New York, N. Y.

N

Nairoil—Oil Burners. National Airoil Burner Co., Philadelphia, Pa.

National—Blowers, Furnaces. P. H. Magill Foundry & Furnace Wks., Bloomington, Ill.

National—Furnaces, Heaters. Excelsior Stove & Mfg. Co., Quincy, Ill.

National—Horizontal Furnaces. Stainless & Steel Products Co., Saint Paul, Minn.

National-Champion—Furnaces. National Heater Co., Minneapolis.

Natroco—Paint. National Mfg. Corp., Tonawanda, N. Y.

Naturstone—Board Insulation. Wilson & Co., Inc., Chicago, Ill.

Nelson—Stokers. Heating Assurance, Spokane, Wash.

Nemo—Insulating Cement. Smith & Kanzler Corp., Elizabeth, N. J.

Nesbit—Furnaces. Standard Furnace & Supply Co., Omaha, Nebr.

Never Slip—Conductor Fittings. LaCrosse Steel Roofing & Corrugating Co., LaCrosse, Wis.

New American—Smoke Pipe Dampers. Griswold Mfg. Co., Erie, Pa.

New Departure—Oil Burners. Aldrich Company, Wyoming, Ill.

New Detroit—Draft Gages. Detroit Air Conditioning Service Co., Inc., Detroit, Mich.

Newmanco—Kalamein Doors, Grilles. Newman Brothers, Inc., Cincinnati, O.

Newton—Mallets. Warren Handle Works Co., Cortland, Ohio.

Niagara—Furnaces. Forest City Foundries Co., Cleveland, O.

Nickelchromeweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Nickelend—Electrodes. Arcos Corp., Philadelphia, Pa.

Nickeloid—Sheets. American Nickeloid Co., Peru, Ill.

9000-Arc—Torch. Mid-States Equipment Co., Chicago.

Niteair—Night Air Cooling Fans. Lau Blower Co., Dayton, Ohio.

Nitrol—Spray Nozzles. Hubbard Company, Minneapolis, Minn.

NoDrip—Insulation. J. W. Mortell Co., Kankakee, Ill.

Noel—Arc Welders. The Ideal Electric & Mfg. Co., Mansfield, O.

No-Flex—Registers and Faces. Hart & Cooley Mfg. Co., Holland, Mich.

Nokorode—Flux. Chase Brass & Copper Co., Incorporated, Waterbury, Conn.

Non-Clogging—Spray Nozzles. Link-Belt Co., Chicago, Ill.

Non-Con-Dux—Cement, Insulation, Paper, Paste. Grant Wilson, Inc., Chicago, Ill.

Non-Metallic—Registers. Standard Stamping & Perforating Co., Chicago, Ill.

Nonnoise—Booster Fans and Blowers. American Foundry & Furnace Co., Bloomington, Ill.

Non-Spark—Mallets. New Plastic Corporation, Hollywood, Calif.

Non-Syphoning—Steel Roofing. Milcor Steel Co., Milwaukee, Wis.

Norblo—Blowers, Fittings, Collectors, Housings, Air Washers. Northern Blower Co., Cleveland, O.

Norco—Products. Northwestern Stove Repair Co., Chicago, Ill.

Norfolk—Furnaces, Heaters, Humidifiers. Sioux City Foundry and Boiler Co., Sioux City, Ia.

No-Rivet—Damper Regulators. Ohio Products Co., Cleveland, O.

Northland—Heaters. J. V. Patten Co., Sycamore, Ill.

North Wind—Window Fans. American Metal Products Co., Fort Worth, Tex.

Norwester—Blowers. Grand Rapids, Die & Tool Co., Grand Rapids, Mich.

No-Sag—Register Shields. Pentecost & Craft Co., Terre Haute, Ind.

No-Spat—Weld Spatter Protector. Midland Paint & Varnish Co., Cleveland, Ohio.

No-Streak—Registers. Rock Island Register Co., Rock Island, Ill.

"No Tar In"—Roofing Paint. Rutland Fire Clay Co., Rutland, Vt.

No. 2000—Insulating Cement. J. H. Krehbiel Co., Chicago, Ill.

Novoid—Bases, Insulation. Cork Import Corp., New York, N. Y.

Nu-Air—Air Conditioning Units. American Metal Products, Fort Worth, Tex.

Nu-Air—Blades, Fans, Louvers, Ventilators. Meier Electric & Machine Co., Indianapolis, Ind.

Nu-Alpina—Gravity Roof Ventilators. Milcor Steel Co., Milwaukee, Wis.

Nubrite—Aluminum Paint. Acorn Refining Co., Cleveland, O.

Nu-Dry—Furnace Cement. Pyrolite Products Co., Cleveland, O.

Nu-Grip—Snips and Shears. J. Wiss & Sons Co., Newark, N. J.

Nu-Notch—Ventilators. Knowles Mushroom Ventilator Co., Montclair, N. J.

Nupla Plastic—Mallets. New Plastic Corporation, Hollywood, Cal.

Nuroof—Roof Cement. Acorn Refining Co., Cleveland, O.

Nuvent—Ventilators. Aeolus Dickinson, Chicago, Ill.

Nusurface—Hot Surface Paint. Acorn Refining Co., Cleveland, O.
Nutipe—Gas Conversion Burners. Columbia Burner Company, Toledo, O.
Nu-Way—Sheet Metal Products. Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.
Nu-Wood—Rigid Insulation. Wood Conversion Co., St. Paul, Minn.

O

OK—Conductor Pipe Strainers. U. S. Cistern Filter Mfg. Co., Bloomington, Ill.
O. P.—Stokers and Stoker-fired Furnaces. Pocahontas Fuel Company Incorporated, Cleveland, O.
Octopus, Jr.—Welding Fume Exhauster. Chelsea Fan & Blower Co., Inc., Irvington, N. J.
Oil-Air-Flo—Furnaces. Lennox Furnace Co., Marshalltown, Iowa.
Oil Chief—Furnaces. Dowagiac Steel Furnace Company, Dowagiac, Mich.
Oil-Economy—Oil-Burning Air-Conditioning Furnace. International Heater Co., Utica, N. Y.
Oil "Fire"—Furnaces. McPherson Furnace & Supply Co., Portland, Ore.
Oilfire Monogram—Furnaces. Quincy Stove Mfg. Co., Quincy, Ill.
Oilfyre—Furnaces. Lennox Furnace Co., Marshalltown, Ia.
Oil Miser—Furnaces. Floral City Company, Monroe, Mich.
Oil-n-Air—Oil Burners. Aldrich Co., Wyoming, Ill.
Oil-O-Matic—Oil Burners, Furnaces. Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
Olympic—Furnaces, Heaters. Washington Stove Works, Everett, Wash.
Olympic Bronze—Bolts, Electrodes, Plates, Sheets. Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
Out-O-Wall—Registers. Rock Island Register Co., Rock Island, Ill.
Ovaltube—Gas Burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Oxweld—Welding Apparatus. Linde Air Products Co., New York, N. Y.
Oxite—Insulation. American Hair & Felt Co., Chicago, Ill.
Ozo-Ray—Air Purification. A & J Co., Chicago.

P

PBA Unit—Utility Room Furnace. Dowagiac Steel Furnace Co., Dowagiac, Mich.
P-K—Screws. Parker-Kalon Corporation, New York, N. Y.
P & H—Arc Welding Electrodes. Harnischfeger Corporation, Milwaukee, Wis.
P & H Hansen—Arc Welders. Harnischfeger Corp., Milwaukee, Wis.
P & R—Air Conditioning Units, Furnaces and Pumps. Pernot & Rich, Inc., Los Angeles, Calif.
Pacifelt—Insulation. Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Pacific—Furnaces. W. W. Rosebaugh Co., Salem, Ore.
Packaged Weather—Store Coolers. General Electric Co., Bloomfield, N. J.
Paintgrip—Sheets. American Rolling Mill Co., Middletown, Ohio.
Pak-Ice—Machines. Vilter Manufacturing Co., Milwaukee.
Palco Wool—Saferized—Insulation. Pacific Lumber Co., San Francisco, Calif.
Panelray—Floor Furnaces. Day & Night Mfg. Co., Monrovia, Cal.

Paramount—Flashing. Flemm Lead Company, Inc., Long Island City, N. Y.
Paramount—Flashings. Rochester Lead Works, Inc., Rochester, N. Y.
Paramount—Hollow Metal Windows. Willis Mfg. Co., Galesburg, Ill.
Parasol—Spray Nozzles. Spraying Systems Co., Chicago, Ill.
Parco—Skylight Lifts. Park City Cor-nice Works, Inc., Bridgeport, Conn.
Par-Exc—Oil Furnaces. Interstate Metal Products Co., Inc., Chicago, Ill.
Parkerizing—Metal treating processes. Parker Rust-Proof Co., Detroit, Mich.
Parkaspray—Humidistats and hygrometers. Parks-Cramer Co., Fitchburg, Mass.
Patterson—Roofing Clips. American Sheet Metal Works, New Orleans, La.
Payne-A-Vent—Fittings. Payne Furnace & Supply Co., Inc., Beverly Hills, Calif.
Payneheat—Heating Units. Payne Furnace & Supply Co., Beverly Hills, Calif.
Pebble—Gravity Registers. Auer Register Co., Cleveland, O.
Pecos—Low-Tin Solder. National Lead Co., New York City.
Peer—Welders. Pier Equipment Mfg. Co., Benton Harbor, Mich.
Peerless—Blowers, Washers. New York Blower Co., Chicago, Ill.
Peerless—Eaves Trough Hangers. Asbestos Mfg. Co., Painesville, O.
Pendlex—Metal Hose. Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Penglass—Round "Accelerator" Roof and "Relief" Ridge Ventilators. Pennsylvania Wire Glass Co., Philadelphia.
Penn-Aire—Furnaces. Union Mfg. Co., Boyertown, Pa.
Pennagun—Water Heaters. Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
Penn-Mont—Slate. Structural Slate Co., Pen Argyl, Pa.
PennSalt—Rust Preventive Chemicals and Cleaners. Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Pentco—Combination Snips and Punches. Penn Tool Company, Philadelphia, Pa.
Perfection—Eaves Trough Fittings and Accessories. Iwan Brothers, South Bend, Ind.
Perfection—Electrodes, Rivets. Anthony Carlin Co., Cleveland.
Perfection—Mineral Wool Insulation. Riverton Lime & Stone Co., Inc., Riverton, Va.
Perfect-Lap Two-Drain—Steel Roofing. Milcor Steel Co., Milwaukee, Wis.
Perno-Aire—Filters. Air Devices, Inc., New York, N. Y.
Perry—Damper Clips and Tips. Griswold Mfg. Co., Erie, Pa.
Pet—Oil Burners. Aldrich Co., Wyoming, Ill.
Peteo—Baffles, Interlocking Combustion Chambers. B. A. Peterson Co., Dowagiac, Mich.
Petro—Oil Burners, Furnaces and Water Heaters. Petroleum Heat & Power Co., Stamford, Conn.
Pexto—Metal Workers' Machines and Tools. Peck, Stow & Wilcox Co., Southington, Conn.
Philco-York—Unit Air Conditioners. Philco, Philadelphia, Pa.
Pilot—Fans, Blowers and Motors. F. A. Smith Mfg. Co., Inc., Rochester, N. Y.
Pioneer—Oil Burners. Scott-Newcomb, Inc., St. Louis, Mo.
Planeweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.
Planovane—Exhausters. B. F. Sturtevant Co., Hyde Park, Mass.

Plasteel—Roofing. Protected Steel Products, Washington, Pa.
Plaster Bond—Compounds. Barrett Div., Allied Chemical & Die Corp., New York, N. Y.
Plastic-Calk—Caulking Compounds. Chamberlin Metal Weather Strip Co., Inc., Detroit, Mich.
Plastic Elastigum—Cement. Barrett Div., Allied Chemical & Die Corp., New York, N. Y.
Plastic PB—Cement. Barrett Div., Allied Chemical & Die Corp., New York, N. Y.
Plastiklast—Roof Cement and Waterproofing Compound. Acorn Refining Co., Cleveland, O.
Plastikon—Glazing Compound. B. F. Goodrich Co., Akron, O.
Plastikroof—Roofing Paint. Evercrete Corporation, New York, N. Y.
Plastiktrim—Plastic Mouldings, Trim, and Tubing and Fittings. R. F. Werner Co., New York, N. Y.
Plastite—Caulking Compounds. U. S. Stoneware Co., Akron, O.
Plastold—Compounds, Furnace Cement. Plastic Products Co., Detroit, Mich.
Plexiform—Blowers. Bayley Blower Co., Milwaukee, Wis.
Plivane—Grilles and Registers. Tuttle & Bailey, Inc., New Britain, Conn.
Pilbrico—Plastic Fire Brick. Pilbrico Jointless Firebrick Co., Chicago, Ill.
Pilecast—Hearth Cement Refractories. Pilbrico Jointless Firebrick Co., Chicago, Ill.
Pilecast L-W-I—Insulating Refractory. Pilbrico Jointless Firebrick Co., Chicago, Ill.
Pisulate—Insulating Cement. Pilbrico Jointless Firebrick Co., Chicago.
Pluramelt—Stainless Clad Sheets. Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Poco—Insulation. C. W. Poe Co., Cleveland, O.
Polair—Air Conditioning Units. Pernot and Rich, Inc., Los Angeles, Calif.
Polar Giant—Air Conditioning Units. Giant Manufacturing Co., Council Bluffs, Ia.
Porto-Shear—Electric Shears. Van Dorn Electric Tool Co., Towson, Md.
Positive Arc—Arc Welders. Welding Apparatus Co., Chicago, Ill.
"Power-Flex"—Stokers. Link-Belt Co., Chicago, Ill.
Powerstat—Valves. Mercold Corp., Chicago, Ill.
Precipitron—Automatic Air Filter. Westinghouse Electric & Manufacturing Co., Cleveland, O.
Premier—Electrodes and Welding Rod. American Steel & Wire Co., Cleveland, O.
Premier—Furnace Vacuum Cleaner. Electric Vacuum Cleaner Co., Inc., Cleveland, O.
Premier Automatik—Stoker-Fired Air Conditioning Furnaces. Premier Furnace Co., Dowagiac, Mich.
Premier DeLuxe—Furnaces. Premier Furnace Co., Dowagiac, Mich.
Premier Master—Furnaces. Premier Furnace Co., Dowagiac, Mich.
Pre-Notch—Ducts, Pipe and Fittings. Gray Metal Products, Inc., Rochester, N. Y.
Preprite—Rust Preventive Chemicals. Neilson Chemical Co., Detroit, Mich.
Prepwash—Rust Preventive Chemicals. Neilson Chemical Co., Detroit, Mich.
Presstico—Furnace and Roof Cement. Compounds, Paint. Presstite Engineering Co., St. Louis, Mo.
Presteel—Metal Stampings. Worcester Pressed Steel Co., Worcester, Mass.

Presteel—Fan Housings. Commercial Shearing & Stamping Co., Youngstown, Ohio.

Prest-O-Lite—Soldering Coppers, Soldering Torches, Welding Equipment. Linde Air Products Co., New York, N. Y.

Prest-O-Weld—Oxy-Acetylene Welding Equipment, Torches. Linde Air Products Co., New York, N. Y.

Princo—Hydrometers, Psychrometers, Electric Relays, Thermometers and Thermostats. Precision Thermometer and Instrument Co., Philadelphia, Pa.

Properaire—Blowers. Grand Rapids Die & Tool Co., Grand Rapids, Mich.

Protectolite—Thermostats. Sampel Time Control, Inc., Spring Valley, Ill.

Protectomotor—Filters. Dollinger Corporation, Rochester, N. Y.

Protector—Snow Guards. David Levow, New York, N. Y.

Protectorelay—Electric Relays. Minneapolis - Honeywell Regulator Co., Minneapolis, Minn.

Proxlin—Enamels & Lacquers. Acme White Lead and Color Works, Detroit, Mich.

Pul-Air—Ventilators. Lyons, Conklin & Co., Inc., Baltimore, Md.

Pul-Air—Ventilators. Penn Ventilating Co., Philadelphia, Pa.

Pul-Air Ridge—Ventilators. Penn Ventilating Co., Philadelphia, Pa.

Pulverzone—Stokers. American Coal Burner Co., Chicago, Ill.

Punchawl—Tools. Hub Specialty Co., Somerville, Mass.

Punkah—Louvers. Kelvin-White Co., Boston, Mass.

Puralre—Blower-Filters. Kortz Blower Mfg. Co., Grand Rapids, Mich.

Purox—Oxy-Acetylene Welding Equipment and Torches. Linde Air Products Co., New York, N. Y.

Pyrallux—Enamels and Lacquers. E. I. du Pont de Nemours & Co., Wilmington, Del.

Pyrobar—Roofing Tile. United States Gypsum Co., Chicago, Ill.

Pyrofelt—Furnace Insulation. Mitchell & Smith, Incorporated, Toledo, O.

Pyrotron—Temperature Recorders. Bailey Meter Co., Cleveland, O.

Q

Q-Chrome—Insulating Cement. Quigley Company, Inc., New York, N. Y.

Q-Chromatic—Insulating Cement. Quigley Company, Inc., New York, N. Y.

Q-Deck—Roofing. H. H. Robertson Co., Pittsburgh, Pa.

Q-T Ductliner—Celotex Corp., Chicago, Ill.

Quadrill—Four-Position Turret Drill Head. Chicago Precision Equipment Co., Chicago.

Quaker Burnoil—Oil Burners, Furnaces and Heaters. Quaker Mfg. Co., Chicago, Ill.

Quaker City—Eaves Trough and Gutters, Conductor Fittings and Accessories, Pipe, Ridge Rolls and Ridging. Berger Brothers Company, Philadelphia, Pa.

Queen City—Shears. Niagara Machine & Tool Works, Buffalo, N. Y.

Quick Heat—A. C. Furnace. American Stove Co., Loraine, O.

Quick Heater—Oil Burners. Quick Furnace & Supply Company, Des Moines, Iowa.

Quick-Set—Dividers. Reiner & Campbell, Inc., Elizabeth, N. J.

Quickwork—Shears and Sheet Metal Machines. Whiting Corporation, Harvey, Ill.

Quiet May—Air Conditioning Furnaces, Units, Oil Burners. May Oil Burner Corp., Baltimore, Md.

Quiet Zone—Blowers. Palmer Manufacturing Co., Phoenix, Ariz.

"Quilt"—Insulation. Samuel Cabot, Inc., Boston, Mass.

R

R & G—Grilles, Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

RBC—Bearings. Roller Bearing Co. of America, Trenton, N. J.

r/h—Furnaces. Rybóit Heater Company, Ashland, Ohio.

R.I.W.—Paint and Waterproofing. Toch Bros., Inc., Elm Pk., S. I., N. Y.

R. I. W. Liquir Konkert—Paint. Toch Bros., Inc., Elm Pk., S. I., N. Y.

R. I. W. Plug-A-Leak—Roofing Paint. Toch Bros., Inc., Elm Pk., S. I., N. Y.

R & I—Furnace Cement and Insulation. Refractory & Insulation Corp., New York, N. Y.

R & I—Natlpe—Combustion Chambers. Refractory & Insulation Corp., New York, N. Y.

R & M—Motors. Robbins & Myers, Inc., Springfield, O.

R.M.C.—Burners. Rotary Mfg. Co., Los Angeles, Calif.

RP—Filters. Research Products Corporation, Madison, Wis.

RPM—Flashing and Roofing Steel. H. H. Robertson Co., Pittsburgh, Pa.

R-R-M—Hygrometers, Psychrometers. The Palmer Co., Cincinnati, O.

R-U-F—Fans and Ventilators. Reed Unit-Fans, Inc., New Orleans, La.

Race—Air Conditioning Units and Gas Furnaces. Royal Air Conditioning Equipment, Alhambra, Calif.

Radiation Discs—Stoker Baffles. Munn and Steele, Inc., Newark, N. J.

Radi-Jon—Ozone Apparatus. Montgomery Brothers, San Francisco, Calif.

Radolite—Insulating Cement and Refractories. Pyrolite Products Co., Cleveland, O.

Radiant Heat—Baffles. Jones Products Company, Ferndale, Mich.

Rainbow Mist—Nozzles. National Engineering & Manufacturing Co., Kansas City, Mo.

Raintite—Roof Ventilators. Aeolus Dickinson, Chicago, Ill.

Ralpo—Sheet Metal Cutters. Ralph W. Poe, Canton, Ill.

Rameo—Chimney Caps and Tops. Royal-Apex Mfg. Corp., Brooklyn, N. Y.

Ranarex—CO₂ Analyzers. Permutit Co., New York, N. Y.

Rapid Fire—Furnaces and Heaters. Reynolds Mfg. Co., Springfield, Mo.

Rawl-Anchors—Bolts. Rawlplug Company, Inc., New York, N. Y.

Rawl-Drive—Masonry Nails and Expansion Bolts. Rawlplug Co., Inc., New York, N. Y.

Rawl-Tapers—Expansion Bolts. Rawlplug Co., Inc., New York, N. Y.

Reactance Arc—Portable Welders. Miller Electric Mfg. Co., Inc., Appleton, Wis.

Reco—Fans and Motors. Reynolds Electric Co., Chicago, Ill.

Recoy—Air Conditioning Units and Coils, Refrigeration Economics Co., Inc., Canton, O.

Red Devil—Furnace Cement. Pecora Paint Co., Philadelphia, Pa.

Redi—Stokers. General Machinery Co., Spokane, Wash.

Redi-Lift—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.

Redi-Nail—Eaves Trough Hangers. Abbott Mfg. Co., Painesville, O.

Redi-Paint—Prime Paint for Galvanized Surfaces. Turco Products, Inc., Los Angeles, Calif.

Redi-Set—Rivet Squeezer. Whitney Metal Tool Co., Rockford, Ill.

Red Metallic—Roofing Paint. Clinton Metallic Paint Co., Clinton, N. Y.

Redox—Paint. Thompson & Co., Pittsburgh, Pa.

Red-Reading-Mercury—Hygrometers, Psychrometers, and Thermometers. The Palmer Co., Cincinnati, O.

Red Seal—Sheets. Benjamin Wolff and Company, Chicago, Ill.

Red Top—Thermostats. H-B Instrument Company, Chicago, Ill.

Red Top—Thermostats. H-B Instrument Company, Philadelphia, Pa.

Red X—Cleaners and Polishers. Turco Products, Inc., Los Angeles, Calif.

Reed—Micrometers. George Scherr Co., Inc., New York City.

Reformend—Electrodes. Arcos Corp., Philadelphia, Pa.

Rego—Brazing Torches. National Cylinder Gas Co., Chicago, Ill.

Rego—Flux. Bastian-Blessing Co., Chicago, Ill.

Rehlinloy—Stove and Furnace Repairs. Pittsburgh Furnace Parts Co., Pittsburgh, Pa.

Reau—Filters. American Air Filter Co., Inc., Louisville, Ky.

Renavent—Steel Wool Filters. American Air Filter Co., Inc., Louisville, Ky.

Republic—Gas Conversion Burners. Autogas Corp., Chicago, Ill.

Republic-Taylor—Terne Roofing Plates. Republic Steel Corporation, Cleveland, O.

Resiscote—Paint. Relly Tar & Chemical Corporation, Indianapolis, Ind.

Rex—Bearings, Pillow Blocks, Blower-Filter Units, Blowers, Fan-Filter Units, Blower Wheels. Air Controls, Inc., Cleveland, O.

Rex—Bearings, Couplings and Nozzles. Chain Belt Co., Milwaukee, Wis.

Rex—Furnaces. Calkins & Pearce, Columbus, O.

Rex-Air-Pak—Blower Units. Air Controls, Inc., Cleveland, O.

Rexco—Refractories. Rex Clay Products Co., Detroit, Mich.

Rexide—Metal Protecting Paint. A. C. Horn Co., Long Island City, N. Y.

Rexoil—Oil Burners, Furnaces. Relf-Rexoil, Inc., Buffalo, N. Y.

Rex-Roto—Combustion Chambers, Refractories, Rex Clay Products Co., Detroit, Mich.

Rex-Tube—Flexible Duct Connectors. Chicago Metal Hose Corp., Maywood, Ill.

Rexvane—Blowers. B. F. Sturtevant Co., Boston, Mass.

Rex Vibra-Sorbers—Vibration Eliminating Metal Hose. Chicago Metal Hose Corporation, Maywood, Ill.

Rex-Weld—Colls. Chicago Metal Hose Corporation, Maywood, Ill.

Rexwelders — Spot Welders. Dyer Welder & Engineering Co., Kansas City, Mo.

Reyn-O-Cell — Insulation. Reynolds Metals Co., Richmond, Va.

Reynolds — Ducts and Duct Fittings, Dampers. Richmond Radiator Co., Inc., Uniontown, Pa.

Rezistal — Stainless Steels. Crucible Steel Co. of America, New York, N. Y.

Rhinamel — Enamels. Tropical Paint & Oil Co., Cleveland, O.

Rhino — Caulking and Glazing Compounds. Pecora Paint Co., Philadelphia, Pa.

Rich-Con — Ventilators. A-J Mfg. Co., Kansas City, Mo.

Ridged Lock — Cold Air Faces. Air Control Products, Inc., Coopersville, Mich.

Ridgolator — Ridge Roof Ventilator. Klauer Mfg. Co., Dubuque, Ia.

Rincon-trol — Enamels and Lacquers. Roxalin Flexible Finishes, Inc., Elizabeth, N. J.

RiP-Clean — Filters. Research Products Corporation, Madison, Wis.

Rip-o-Lin — Enamels. Glidden Company, Cleveland, O.

Rip-pl — Enamels, Lacquers and Paints. Hilo Varnish Corp., Brooklyn, N. Y.

Riverside — Furnaces. Rock Island Stove Co., Rock Island, Ill.

Rivnut — Blind Fasteners. B. F. Goodrich Co., Akron, Ohio.

Robinson — Brakes, Presses and Dies, Punches. New Albany Machine Mfg. Co., New Albany, Ind.

Rocan — Copper Roofing and Sheets. Revere Copper and Brass Incorporated, New York, N. Y.

Roche — Paint Spray Guns. Binks Mfg. Co., Chicago.

Rocktex — Insulation. Philip Carey Co., Lockland, Cincinnati, O.

Rollaire — Air Conditioning Furnaces. Hipoint Corp., Bellefontaine, O.

Roof Flange — Flashing. Eagle-Picher Lead Co., Cincinnati, O.

Roofkoter — Paint. Tropical Paint & Oil Co., Cleveland, O.

Roof-Vent — Ventilators. Reed Unit-Fans, Inc., New Orleans, La.

Rosetop — Ventilators. Danzer Metal Works Co., Hagerstown, Md.

Rotary — Gravity Ventilators. The Swartwout Co., Cleveland, O.

Rotary Suction — Ventilators. F. O. Schoedinger, Columbus, O.

Rotex — Punches and Shears. M. Bollert, Oakland, Calif.

Roto — Insulating Cement and Combustion Chambers. Rex Clay Products Co., Detroit, Mich.

Roto-Blast — Furnaces. Moncrief Furnace Co., Atlanta, Ga.

Roto-Clone — Dust Collectors. American Air Filter Co., Inc., Louisville, Ky.

Rotojet — Nozzles. Binks Mfg. Co., Chicago, Ill.

Roxaprene — Enamels and Lacquers. Roxaline Flexible Finishes, Inc., Elizabeth, N. J.

Royal — Caulking Compounds, Cement, Enamels, Lacquers, Waterproofing, Paint. A. Wilhelm Co., Reading, Pa.

Royal — Furnaces. Hart & Crouse Corporation, Utica, N. Y.

Royalastic — Roof Cement. A. Wilhelm Co., Reading, Pa.

Royalbestos — Furnace Cement. A. Wilhelm Co., Reading, Pa.

Royal Blue — Acid and Furnace Brushes. Schaefer Brush Mfg. Co., Milwaukee, Wis.

Royal Clipper — Metal Cutter. C-B Tool Co., Lancaster, Pa.

Rubalt — Enamels, Lacquers and Paint. Alfred Hague & Co., Inc., Brooklyn, N. Y.

Rubutex — Insulation. Virginia Rubutex Div., Great American Industries, Inc., Bedford, Va.

Rubber-In-Shear — Vibration Isolating Pads. Korfund Co., Long Island City.

Rubber Putty — Glazing Compound. B. F. Goodrich Co., Akron, O.

Rubyfluid — Solder, Soldering Flux, Tinning Compounds. Ruby Chemical Co., Columbus, O.

Rudico — Furnaces. Rudy Furnace Co., Dowagiac, Mich.

Rudisteel — Furnaces. Rudy Furnace Co., Dowagiac, Mich.

Rudy — Ventilators. Accurate Mfg. Works, Chicago, Ill.

Rusco — Windows. Russell Co., F. C., Cleveland, O.

Rustall — Paints. National Engineering Products, Inc., Washington, D. C.

Ryson — Sioux Steel Co., Sioux Falls, S. D.

S

S — Sheets. The Superior Sheet Steel Co., Canton, O.

S C — Furnaces. Surface Combustion, Toledo, O.

S.D.T.—Freeze Proof — Coils. John J. Nesbitt, Inc., Philadelphia.

S-E — Gravity Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

SF — Soldering Coppers, Torches, Welders. Slight Feed Generator Co., Richmond, Ind.

S. I. S. — Cement. Barrett Div., Allied Chemical & Die Corp., New York, N. Y.

S-L — Bar Folders, Nibblers, Slitting Machines. St. Louis Tool Co., St. Louis, Mo.

S-N — Furnaces, Oil Burners, Stokers. Scott-Newcomb, Inc., St. Louis, Mo.

S O S — Variable Speed Pulleys. Ideal Commutator Dresser Co., Sycamore, Ill.

SRP — Metal Protecting Paint. L. Sonneborn Sons, Inc., New York, N. Y.

Safety Circle — Motors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Saf-ty — Mallets. Martin Bersted Co., Chicago, Ill.

St. Louis — Stoker. Ormsby-Osterman Co., St. Louis, Mo.

Sair Seal — Insulating Cement. A. P. Green Fire Brick Co., Mexico, Mo.

Sai-Mo — Cement, Insulation, Pipe Coverings. Sall Mountain Co., Chicago, Ill.

Samco — Cement. Standard Asbestos Mfg. Co., Chicago, Ill.

Sampson — Furnace Brushes. Worcester Brush & Scraper Co., Worcester, Mass.

Sanidair — Humidifiers. U. S. Air Conditioning Corp., Minneapolis, Minn.

saram — Plastic Tubing and Fittings. Acadia Synthetic Products Div., Chicago, Ill. Commercial Plastics Co., Chicago. Skuttle Mfg. Co., Detroit, Mich. Hodgman Rubber Co., Framingham, Mass.

Satis-Fyre — Oil Burners. Shedlov Oil Burners, Inc., Minneapolis, Minn.

Sauter — Time Switches. R. W. Cramer Co., Inc., Centerbrook, Conn.

Sav-Haf — Oil Burners. Aldrich Co., Wyoming, Ill.

Saw-Chief — Hack Saws. Chicago Precision Equipment Co., Chicago.

Saw-Gun — Power Saw. Mid-States Equipment Co., Chicago.

Sealfux — Soldering Flux. Sealf Co., Oakmont, Pa.

Schmidt — Soldering Coppers, Soldering and Brazing Torches. Minn-Köta Foundry & Mfg. Co., Fargo, N. D.

Seo-Co — Roof Cement, Compounds, Paint, Roofing and Waterproofing. Southport Paint Co., Savannah, Ga.

Scroll-Pivoter — Snips and Shears. Wiss & Sons Co., J., Newark, N. J.

Scruplex — Fans and Ventilators. L. J. Wing Mfg. Co., New York, N. Y.

Sea-Lion — Leather Belting. Chicago Belting Co., Chicago.

Seal Master — Bearings. Stephens-Adamson Mfg. Co., Aurora, Ill.

Seal of Quality — Roofing. Columbia Steel Co., San Francisco, Calif.

Sealpruf — Waterproofing. General Insulating Products Co., Brooklyn, N. Y.

Seal-Tite — Registers. Char-Gale Mfg. Co., Minneapolis, Minn.

Seal-Tite — Roof Cement. C. Arthur Miller & Son, Elmira, N. Y.

Seamless — Furnaces. Waterman-Waterbury Co., Minneapolis, Minn.

Season-stat — Limit Controls. L. J. Mueller Furnace Co., Milwaukee.

Security — Caulking and Roofing. National Mfg. Corp., Tonawanda, N. Y.

Selsme-Dampers — Vibration Isolating Bases. Korfund Co., Inc., Long Island City, N. Y.

Selectair — Air Conditioning Units and Oil Furnaces. S. T. Johnson Co., Oakland, Calif.

Select-O-Speed — Variable Speed Pulleys. Ideal Commutator Dresser Co., Sycamore, Ill.

Self-Cleaning — Furnaces. Moore Corp., Joliet, Ill.

Self-Seal Re-Fil-Able — Filters. Research Products Corporation, Madison, Wis.

Self-Stoker — Furnaces. Viking Manufacturing Corporation, Dayton, O.

Selfvule — Waterproofing Compounds, Paint. Self-Vulcanizing Rubber Co., Inc., Chicago, Ill.

Semco — Crimping and Slitting Machines, Presses and Dies, Punches, Snips and Shears. Service Machine Co., Elizabeth, N. J.

Sensatherm — Thermostats. Mercold Corp., Chicago, Ill.

Sensitrol — Electrical Relays. Weston Electrical Instrument Corp., Newark, N. J.

Sentinel — Floor Furnaces. Stoker-Lad Co., Tacoma, Wash.

Sentry — Furnaces. Payne Furnace & Supply Co., Beverly Hills, Calif.

Series "H" — Coils. John J. Nesbitt, Inc., Philadelphia, Pa.

Series "W" — Coils. John J. Nesbitt, Inc., Philadelphia, Pa.

70 Serviceman — Recording Thermostat. Jas. P. Marsh Corp., Chicago, Ill.

Serviron — Plastic Coating. Saverite Engineering Co., Hoboken, N. J.

Sheetrock — Duct Board. United States Gypsum Co., Chicago, Ill.

Shield-Are — Electrodes and Welders. Lincoln Electric Co., Cleveland, O.

- Shock Absorbing**—Pillow Blocks. Triangle Mfg. Co., Oshkosh, Wis.
- Shock Pads**—Vibration Isolating Pads. Vibration Control Co., New York, N. Y.
- Shower-Proof**—Paint. Calbar Paint & Varnish Co., Philadelphia, Pa.
- Shur-Heat**—Stokers. Air Conditioning & Stokers, Inc., St. Louis, Mo.
- Shut-O-Vent**—Louvers and Shutters. Reed Unit-Fans, Inc., New Orleans, La.
- Sievert**—Soldering Furnaces and Torches. J. A. Sanders, Fulton, N. Y.
- Silent**—Furnace Blowers. Air Conditioning Equipment Co., Minneapolis, Minn.
- Silent Air**—Fans. Belanger Fan & Blower Co., Detroit, Mich.
- Silentair**—Blowers, Filters. Gehrl Co., Tacoma, Wash.
- Silentaire**—Window Ventilator and Filter Units. Berger Mfg. Div., Republic Steel Corp., Canton, O.
- Silent-Auburn**—Oil Burners, Furnaces, Heaters. Auburn Burner Co., Auburn, Ind.
- Silent Automatic**—Fire Doors and Shutters. Meyer Mfg. Co., Detroit, Mich.
- Silent Automatic**—Louvers & Shutters. Alrecon Industries, Inc., Detroit, Mich.
- Silentblu**—Gas Burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
- Silentvane**—Blowers. B. F. Sturtevant Co., Boston, Mass.
- Silere**—Fans. Aire-Folle Fan & Blower Company, Detroit, Mich.
- Sil-Fos**—Solder. Handy & Harman, New York, N. Y.
- Silicair**—Insulation. Western Silicair Products, Inc., Burbank, Calif.
- Siloy-Soder**—Solder. L. B. Allen Co., Inc., Chicago, Ill.
- Silver-Lume**—Paint. Wilbur & Williams Co., Boston.
- Silver-Soder**—Solder. L. B. Allen Co., Inc., Chicago, Ill.
- Silver Steel**—Saws. E. C. Atkins & Co., Indianapolis, Ind.
- Silver-Seal**—Aluminum Paint. Asphalt Products Co., Syracuse, N. Y.
- Silvertile**—Paint. Cheesman-Elliott Co., Inc., Brooklyn.
- Simplex**—Quadrants. Ohio Products Co., Cleveland, O.
- Simplex**—Pneumatic Hammer. Chicago Pneumatic Tool Co., New York, N. Y.
- Simplex**—Humidifiers. Henry Kraker, Holland, Mich.
- Simplex**—Insulation. Keasbey & Mattison Co., Ambler, Pa.
- Simplex**—Stoker. Stoker Products, Inc., Decatur, Ill.
- Sim-trol**—Barometric Dampers. Simplex Mfg. Co., Fond du Lac, Wis.
- Sioux**—Drills, Grinders. Sanders. Albertson & Co., Inc., Sioux City, Ia.
- Stroeco**—Air Conditioning Units, Blowers, Fans, Ventilators, Washers. American Blower Corp., Detroit, Mich.
- Skill Drill**—Electric Drill. Skillsaw, Inc., Chicago, Ill.
- Slaters' Felt**—Insulation. Barrett Div. Allied Chemical & Die Corp., New York, N. Y.
- Smith & Hemenway**—Tools. Crescent Tool Co., Jamestown, N. Y.
- Smith's**—Torches, Welders and Equipment. Smith Welding Equipment Co., Minneapolis, Minn.
- Smithway**—Water Storage Heaters. A. O. Smith Corp., Milwaukee.
- Snap Action**—Humidifier Valves. McDonnell & Miller, Chicago 11.
- Snaplok**—Furnace Pipe. Reeves Steel & Mfg. Co., Dover, O.
- Snapon**—Mouldings & Trim. John Lees Div., Serrick Corp., Muncie, Ind.
- Snap-Rite**—Ducts, Pipe and Fittings. Gray Metal Products, Inc., Rochester, N. Y.
- Snap-Tite**—Damper Regulators, Clips and Tips. M. A. Gerett Corp., Milwaukee, Wis.
- Sno-Breeze**—Coils. Palmer Mfg. Corp., Phoenix, Ariz.
- Saug-Fit**—Coils. Hotstream Heater Co., Cleveland, O.
- Soder**—Solder. L. B. Allen Co., Inc., Chicago.
- Softweld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.
- Sol-Air**—Floor Furnaces. Utility Appliance Corporation, Los Angeles.
- Solaraire**—Air Conditioning Furnace. St. Louis Furnace Mfg. Co., St. Louis, Mo.
- Solderprep**—Flux for Steel. Neilson Chemical Co., Detroit, Mich.
- Solex**—Heat Insulating Windows. Pittsburgh Plate Glass Co., Pittsburgh.
- Solid Asphalt**—Waterproofing. Ford Roofing Products Co., Chicago, Ill.
- Solid Comfort**—Furnaces. May-Flebecker Co., Newark, O.
- Sono-O-Seal**—Insulation. General Insulating Products Co., Brooklyn, N. Y.
- Soreco**—Chimney Taps and Tops. Southbridge Roofing Co., Southbridge, Mass.
- So Salts**—Tinning Compound and Flux. Turco Products, Inc., Los Angeles, Calif.
- Southaire**—Stokers. E. E. Souther Iron Co., St. Louis, Mo.
- Sovaklor**—Protecting Paint Metal. Socony Paint Products, New York, N. Y.
- Sovalex**—Metal Protecting Paint. Socony Paint Products, New York, N. Y.
- Spacesaver**—Heating Unit. Payne Furnace & Supply Co., Beverly Hills, Calif.
- Spartan**—Kitchen Exhaust Fan. F. A. Smith Mfg. Co., Rochester, N. Y.
- Spatter-Nox**—Welding Compound. Universal Power Corp., Cleveland, O.
- Spatter-Off**—Welding Compound. Universal Power Corp., Cleveland, O.
- Special X**—Solder. Industrial Service Laboratories, Milwaukee, Wis.
- Speed O**—Soldering Flux. Pfanstiehl Chemical Co., Waukegan, Ill.
- Spedene**—Glazing Compound. Glidden Co., Cleveland, O.
- Speedare**—Electrodes. Universal Power Corporation, Cleveland, O.
- Speed Clips**—Spring Steel Fastenings. Tinnerman Products, Inc., Cleveland, O.
- Speed Dee**—Coils. Air Controls, Inc., Cleveland, O.
- Speed-heat**—Furnaces. Marshall Furnace Co., Marshall, Mich.
- Speed Nuts**—Sheet Metal Nuts. Tinnerman Products, Inc., Cleveland, O.
- Speed-Up**—Concrete Waterproofing Cement. Hilo Varnish Corp., Brooklyn, N. Y.
- Sphinx**—Blower-Filter Units, Burners, Furnaces. C. L. Bryant Corp., Cleveland, O.
- Splitter**—Ceiling Ventilators. Mileor Steel Co., Milwaukee, Wis.
- Spiral-Lok**—Variable Speed Pulleys. Scientiae Tool Co., Dayton, Ohio.
- Spirovane**—Ventilating Fans. Western Blower Co., Seattle, Wash.
- Sprague**—Furnaces. Katelman Foundry & Mfg. Co., Council Bluffs, Ia.
- Sprayit**—Paint Gun, Humidifiers, Nozzles. Electric Sprayit Co., Sheboygan, Wis.
- Spra-Rite**—Nozzles. Binks Mfg. Co., Chicago, Ill.
- Stable-Arc**—Arc Welding Electrodes, Arc Welders. Lincoln Electric Co., Cleveland, O.
- Stack Heat**—Heat Savers. Robert Barclay, Inc., Chicago.
- Staldare**—Electrodes. Universal Power Corporation, Cleveland, O.
- Stainare**—Electrodes. Universal Power Corporation, Cleveland, O.
- Stainlend**—Electrodes. Arcos Corporation, Philadelphia, Pa.
- Stainweld**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.
- Sta-Lock**—Prefabricated Ducts and Duct Fittings. Chicago Furnace Supply Co., Chicago, Ill.
- Stamco**—Furnace Pipe, Fittings. Cincinnati Stamping Co., Cincinnati, O.
- Stamco**—Sheet and Plate Machinery. Streine Tool & Mfg. Co., New Bremen, O.
- Standard**—Furnaces. Aladdin Heating Corp., Oakland, Calif.
- Standard**—Furnaces. Farris Furnace Co., Springfield, Ill.
- Standard**—Furnaces. Home Furnace Co., Holland, Mich.
- Standard**—Stokers. Sun-Fire Stoker Corporation, New Albany, Ind.
- Standard**—Ventilators. Allen Corp., Detroit, Mich.
- Standard Tipton**—Furnaces. Klein Stove Co., Philadelphia, Pa.
- Standforated**—Grilles. Standard Stamping & Perforating Co., Chicago, Ill.
- Star**—Soldering Furnaces. Burgess Soldering Furnace Co., Columbus, O.
- Star**—Ventilators. Merchant & Evans Co., Philadelphia, Pa.
- Stattek**—Ventilators. W. F. Hirschman Co., Inc., Buffalo.
- Staxausters**—Ventilators. Allen Corporation, Detroit.
- Steelcore**—Galvanized Steel Shingles. Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
- Steel-Fin**—Heating Coils. New York Blower Co., Chicago, Ill.
- Steelmaster**—Shingles and Tile. Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
- Steel Mixture**—Baffles and Refractories. McLeod & Henry Co., Inc., Troy, N. Y.
- Sterling Bender**—Beading Machines. F. L. Robertson, Buffalo, N. Y.
- Sterling**—Evaporative Coolers and Compressors. Reynolds Mfg. Co., Springfield, Mo.
- Steward**—Presses and Dies. Ward Machinery Co., Chicago, Ill.
- Stewart**—Furnaces. Fuller-Warren Co., Milwaukee, Wis.
- Stic-Tite**—Cement Refractory & Insulation Corp., New York, N. Y.

Stokabilt—Air Conditioning Stoker Furnaces. American Foundry & Furnace Co., Bloomington, Ill.

Stok-A-Timer—Stoker Controls. Mer-cold Corp., Chicago, Ill.

Stoker Economy—Stoker Furnaces. In-ternational Heater Co., Utica, N. Y.

Stoker Fire—Furnaces. McPherson Furnace & Supply Co., Portland, Ore.

Stoker-Ola—Stokers. Advance Appli-ance Co., Peoria, Ill.

Stokernator—Domestic Stokers. North-ern Steel & Stoker Corp., Peoria, Ill.

Stokerelay—Relays. Minneapolis-Hon-eywell Regulator Co., Minneapolis, Minn.

Stokermatic—Furnaces and Stokers. Rheem Manufacturing Co., Salt Lake City.

Stokol—Water Heaters. Schwitzer-Cummins Co., Indianapolis, Ind.

Stokol Hydraulic—Stokers. Schwitzer-Cummins Co., Indianapolis, Ind.

Stokol Mercury—Stokers. Schwitzer-Cummins Co., Indianapolis, Ind.

StoneTex—Concrete Waterproofing. Truscon Laboratories, Detroit.

Stonewall—Asbestos-Cement Board. Ruberoid Co., New York, N. Y.

StormSeal—Roofing Steel. Columbia Steel Co., San Francisco, Calif., and American Steel and Wire Company, Cleveland.

Stormtight—Roof Cement. L. Sonne-born Sons, Inc., New York, N. Y.

Stowaway—Attic Furnaces. Lennox Furnace Co., Marshalltown, Ia.

Strate-Edge—Eaves Trough and Gut-ters. Milcor Steel Co., Milwaukee, Wis.

Strate-Liminator—Air Diffusers. Wils-ter Air Devices, Inc., Cleveland, O.

Streamaire—Air Conditioning Units and Colls. Young Radiator Co., Racine, Wis.

Stream-Flo—Ventilators. The Allen Corporation, Detroit, Mich.

Streamjet—Nozzles. Spraying Systems Co., Chicago.

Streamline—Furnaces. Aladdin Heating Corp., Oakland, Calif.

Streamline—Ridge Ventilators. H. H. Robertson Co., Pittsburgh, Pa.

Streamline—Tubing and Fittings. Muel-ler Brass Co., Port Huron, Mich.

Streamlined—Furnaces. Sure Comfort Furnace Co., Berwyn, Ill.

Streekno—Register Packing. Excel Heating & Air Conditioning Co., Chi-cago, Ill.

Sturdybender—Presses. Cyril Bath & Co., Cleveland, O.

Sullare—Electrodes. Universal Power Corporation, Cleveland, O.

Sunbeam—Furnaces, Blower-Filters, Oil Burners, Heaters and Humidifi-ers. American Radiator and Standard Sanitary Corp., Pittsburgh, Pa.

Sunbeam-Allerton—Furnaces. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Sunbeam-Arlington—Furnaces. Ameri-can Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Sunbeam-Bayport—Furnaces. Ameri-can Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Sunbeam-Chippewa—Furnaces. Ameri-can Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Sunbeam-Cliffdale—Furnaces. Ameri-can Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Sunbeam-Clifton—Furnaces. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Sunbeam-Elwood—Oil Floor Furnaces. American Radiator & Standard Sani-tary Corp., Pittsburgh, Pa.

Sunbeam-Kenwood—Furnaces, Heaters. American Radiator & Standard Sani-tary Corp., Pittsburgh, Pa.

Sunbeam-Longwood—Furnaces. Ameri-can Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Sunbeam-Mohawk—Furnaces. Ameri-can Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Sunbeam-Saginaw—Gas Floor Fur-naces. American Radiator & Stand-ard Sanitary Corp., Pittsburgh, Pa.

Sunbeam-Saratoga—Furnaces. Ameri-can Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Sunbeam-Seneca—Furnaces. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Sunbeam-Shawnee—Furnaces. Ameri-can Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Sunbeam-Westmoreland—Furnaces. American Radiator & Standard Sani-tary Corp., Pittsburgh, Pa.

Sunbeam-Wyandotte—Furnaces. Ameri-can Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Sun Fuel Master—Furnaces and Heat-ers. J. V. Patten Co., Sycamore, Ill.

Sunglo—Furnaces. Moore Corp., Joliet, Ill.

Sunrise—Gas and Oil Burners. Kals Sunrise Works, Detroit, Mich.

Super—Hangers and Fittings. Royal-Apex Mfg. Corp., Brooklyn, N. Y.

Super—Plastic Furnace Lining. Walsh Refractories Corp., St. Louis, Mo.

Super—Pneumatic Tools. Keller Tool Company, Grand Haven, Mich.

Supernair—Air Conditioning Furnaces. St. Louis Furnace Mfg. Co., St. Louis, Mo.

Supernair—Blower-Filter Units. The Majestic Co., Huntington, Ind.

Super Air Screws—Ventilating Fans. Marathon Electric Mfg. Corp., Wau-sau, Wis.

Superbrite—Aluminum Paint. Acorn Refining Co., Cleveland, O.

Superbrite No. 150—Metal Protecting Paint. Acorn Refining Co., Cleveland, O.

Superfex—Furnaces, Heaters. Perfec-tion Stove Co., Cleveland, O.

Superfin—Furnaces. American Fdry. & Furnace Co., Bloomington, Ill.

Super Firma—Gravity Roof Ventila-tors. W. F. Hirschman Co., Inc., Buf-falo, N. Y.

Superflux N. O. 215—Soldering Flux. Paul Lewis Laboratories, Inc., Mil-waukee, Wis.

Superheat—Furnaces. Dallman Supply Co., Sacramento, Calif.

Superior—Enamels. Blue Ridge Talc Co., Inc., Henry, Va.

Superior—Blowers. American Foundry & Furnace Co., Bloomington, Ill.

Superior—Sheets. Continental Steel Corp., Kokomo, Ind.

Superior—Soldering Furnaces and Torches. P. Wall Mfg. Supply Co., N. S. Pittsburgh, Pa.

Superlife—Furnace. Excelsior Steel Furnace Co., Chicago, Ill.

Super-Nickel—Fittings. American Brass Co., Waterbury, Conn.

Super-Por-Seal—Waterproofing. Trus-con Laboratories, Detroit.

Super-Quiet—Oil Burners. Green Colo-nial Furnace Co., Des Moines, Ia.

Super Red Streak—Furnace Cleaners. National Super Service Co., Toledo, O.

Super Sioux—Ventilators. Sioux Steel Co., Sioux Falls, S. D.

Super-Thermo—Refractory. Chicago Fire Brick Co., Chicago, Ill.

Super X—Industrial Coating. B. F. Nel-son Mfg. Co., Minneapolis, Minn.

Super-X—Roofing Nails. Republic Steel Corporation, Cleveland, O.

Super X—Sheets. Western Brass Mill Div., Olin Industries, Inc., East Alton, Ill.

Supreme—Enamels. Blue Ridge Talc Co., Inc., Henry, Va.

Supreme—Furnaces. American Furnace & Foundry Co., Milan, Mich.

Supreme—Furnaces, Heaters. Agricola Furnace Co., Inc., Gadsden, Ala.

Supreme—Furnaces. McPherson Fur-nace & Supply Co., Portland, Ore.

Sureweld—Arc Welding Electrodes. National Cylinder Gas Co., Chicago, Ill.

Surfaceal—Waterproofing Compound. Gerard Chemical Co., Elizabeth, N. J.

Surfaceweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

SuVeneer—Clad Sheets. Superior Steel Corp., Pittsburgh.

Swanee—Galvanized Shingles. Berger Mfg. Div., Republic Steel Corp., Can-ton, Ohio.

Swedgers—Packam Crimper Company, Mechanicsburg, O.

Sylphon—Controls, Damper Regulators, Thermostats and Valves. Fulton Syl-phon Co., Knoxville, Tenn.

Symmentrex—Waterproofing Compounds. A. C. Horn Co., Long Island City, N. Y.

Synchron—Stoker Controls, Relays, Switches. Industrial Engineering Corp., Terre Haute, Ind.

Synchron "600"—Timing Machines and Motors. Hansen Mfg. Co., Inc., Princeton, Ind.

Syncretizer—School Room Heaters. John J. Nesbitt, Inc., Philadelphia, Pa.

Symonds—Registers. Front Rank Fur-nace Co., Div., Liberty Foundry Co., St. Louis, Mo.

T

Tag—Controls, Humidistats, Hygrome-ters, Recorders, Psychrometers, Thermometers, Thermostats and Gas Pressure Regulating Valves. C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.

Tamanite—Metal Conditioner. Tamms Silica Company, Chicago, Ill.

Tameo—Ventilators. Tiffin Eaves Trough Clamp Co., Tiffin, O.

Tampico—Filters. Chicago Filter Co., Joliet, Ill.

Tanco—Paint. Thompson & Co., Pitts-burgh, Pa.

Taylor—Roofing Ternes. Republic Steel Corporation, Cleveland, O.

Techni-Louvre—Duct Turning Vanes. Waterloo Register Co., Waterloo, Ia.

Techni-Turn—Duct Turning Vanes. Waterloo Register Co., Waterloo, Ia.

Techhi-vane—Duct Turning Vanes. Waterloo Register Co., Waterloo, Ia.

- Technotrol**—Electric Clock Thermostat. White Mfg. Co., St. Paul, Minn.
- Tee Joint**—Pipe Fittings and Accessories. Milcor Steel Co., Milwaukee, Wis.
- Teltru**—Psychrometers and Thermometers. E. Vernon Hill, Chicago, Ill.
- Tem-Clock**—Controls. Penn Electric Switch Co., Goshen, Ind.
- Temco**—Furnaces. Tennessee Enamel Mfg. Co., Nashville, Tenn.
- Temlok**—Insulation. Armstrong Cork Co., Lancaster, Pa.
- Tempered-Aire**—Furnaces. Gar Wood Industries, Inc., Detroit, Mich.
- Tempyte**—Heat Insulating Windows. Truscon Steel Co., Youngstown, O.
- Temtrol**—Thermostats. Penn Electric Switch Co., Goshen, Ind.
- 10-Plastic**—Caulking Compounds. Quigley Co., Inc., New York, N. Y.
- Tension-Lap**—Roofing Steel. Inland Steel Company, Chicago.
- Tensulate**—Insulation. Tennessee Products Corp., Nashville, Tenn.
- Texrope**—V-Belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- Textolite Foam**—Cellular Plastic Insulation. General Electric Co., Plastics Div., Pittsfield, Mass.
- Tharco**—Furnace Cement. The Armstrong Company, Detroit, Mich.
- The General**—Furnaces. General Heating Products Co., Minneapolis, Minn.
- "The Pacific"**—Furnaces. W. W. Rosebraugh Co., Salem, Ore.
- Therma-Flow**—Circulating Heaters. Utility Appliance Corp., Los Angeles, Calif.
- Thermalfuel**—Furnaces. Beck Engineering Combustion Company, St. Louis, Mo.
- Thermek**—Coils. Peerless of America, Inc., Marion, Ind.
- Thermascrete No. 20**—Refractories. Munn and Steele, Inc., Newark, N. J.
- Thermidair**—Air Conditioning Units, Blowers, Coils, Furnaces, Louvers & Shutters. E. K. Campbell Heating Co., Kansas City, Mo.
- Thermix**—Filters. Prat-Daniel Corporation, Port Chester, N. Y.
- Thermo**—Furnaces. American Furnace Co., St. Louis, Mo.
- Thermo**—Gas Soldering Furnace. Ward Machinery Co., Chicago, Ill.
- Thermomemometer**—Anemometer, Willson Products, Inc., Reading, Pa.
- Thermo-Draulic**—Controls, Damper Motors and Regulators. Perflex Corporation, Milwaukee, Wis.
- Thermo-Drip**—Humidifier. Automatic Humidifier Co., Cedar Falls, Ia.
- Thermo-Flex**—Registers. Middleton Mfg. & Sales Co., Minneapolis, Minn.
- Thermogas**—Furnaces. Beck Engineering Combustion Company, St. Louis, Mo.
- Thermogrip**—Soldering Coppers. Ideal Commutator Dresser Co., Sycamore, Ill.
- Thermohm**—Psychrometers. Leeds & Northrup Co., Philadelphia, Pa.
- Thermohumidigraph**—Humidity Recorders. Bristol Co., Waterbury, Conn.
- Thermoil**—Furnaces. Beck Engineering Combustion Company, St. Louis, Mo.
- Thermopane**—Windows. Libbey-Owens-Ford Glass Co., Toledo, O.
- Thermopaste**—Plastic Fire Brick. Chicago Fire Brick Co., Chicago, Ill.
- Thermo-Pilot**—Stoker Timer Relay. Perflex Corporation, Milwaukee, Wis.
- Thermopilot**—Controls. General Controls Co., Glendale, Calif.
- Thermotite**—Insulation. Coast Insulating Corp., Los Angeles, Calif.
- Thermovents**—Heaters. John J. Nesbitt, Inc., Philadelphia.
- Thin-Man**—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
- Thor**—Spray Paint Guns. Binks Mfg. Co., Chicago, Ill.
- Thor**—Electric Buffers, Nibblers and Shears. Independent Pneumatic Tool Co., Chicago, Ill.
- 3-M**—Grinding and Finishing. Minnesota Mining & Manufacturing Co., St. Paul.
- 3000**—Refractories. Refractory & Insulation Corporation, New York, N. Y.
- 370 Special**—Paints. Thompson & Co., Pittsburgh, Pa.
- Threplex**—Flashing. Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
- Thriff**—Time Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
- Throway**—Steel Wool Filters. American Air Filter Co., Inc., Louisville, Ky.
- Tik Wheat**—Pipe Covering Paste. Clark Stek-O Corp., Rochester, N. Y.
- Tilco-Flu**—Coils. Extended Surface, Inc., Brooklyn.
- Tillery's**—Furnace Clock. Little Janitor Furnace Clock Co., New York, N. Y.
- Timercoid**—Time Clock. Mercoid Corp., Chicago, Ill.
- Timerelay**—Relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Time-Saver**—Damper Quadrants. Goese Mfg. Co., Milwaukee, Wis.
- Timetrol**—Switches. Penn Electric Switch Co., Goshen, Ind.
- Ti-Namel**—Vitreous Enameling Alloy Steel Sheets. Inland Steel Co., Chicago.
- Tinexy**—Solder and Flux. Farrelloy Co., Inc., Philadelphia.
- Tin Loy**—Tinning Compounds. Eagle-Picher Lead Co., Cincinnati, O.
- Tinol**—Compounds and Soldering Flux. American Solder & Flux Co., Philadelphia, Pa.
- Tite**—Caulking Compounds. J. H. Krehbiel Co., Chicago, Ill.
- Tite-Lite**—Glazing Compounds. Truscon Laboratories, Detroit.
- Titelock**—Fittings and Accessories for Conductor, Eaves Trough and Gutter, Furnace Pipe, Copper Roofing. Milcor Steel Co., Milwaukee, Wis.
- TiteSeal**—Caulking Compounds. Radiator Specialty Co., Charlotte, N. C.
- Tobin Bronze**—Plates and Welding Rod. American Brass Co., Waterbury, Conn.
- Toel 900**—Roofing Paint. Waterproofing Compounds. Protective Coatings, Incorporated, Detroit, Mich.
- Tomb Brand**—Insulation. Barrett Div., Allied Chemical & Die Corp., New York, N. Y.
- Toncanarc**—Electrodes. Universal Power Corporation, Cleveland, O.
- Toncan Iron**—Roofing. Sheets. Republic Steel Corp., Cleveland, O.
- Toolvold**—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.
- Top-Notch**—Furnaces. Excelsior Steel Furnace Co., Chicago, Ill.
- Toridair**—Furnaces. Fraser and Johnston Co., San Francisco, Calif.
- Torid-Cast**—Refractories. Walsh Refractories Corp., St. Louis, Mo.
- Tornado**—Furnace Vacuum Cleaners. Breuer Electric Mfg. Co., Chicago, Ill.
- Torrid**—Soldering Furnaces and Torches. Geo. W. Diener Mfg. Co., Chicago, Ill.
- Torridheat**—Blower-Filters, Burners, Furnaces and Heaters. Cleveland Steel Products Corp., Cleveland.
- Torrid Zone**—Furnaces. Lennox Furnace Co., Marshalltown, Ia.
- Totalume**—Aluminum Paint. Wilbur & Williams Co., Boston.
- Totrust**—Paints, Enamels. Wilbur & Williams Co., Boston.
- Townley**—Ventilators. A-J Mfg. Co., Kansas City, Mo.
- Transite**—Duct Board, Pipe and Fittings. Johns-Manville, New York, N. Y.
- Transparent**—Air Filter Gauge. F. W. Dwyer Mfg. Co., Chicago, Ill.
- Triangle**—Heaters. Day & Night Mfg. Co., Monrovia, Cal.
- Trico**—Furnaces. Tri-State Heating Supply Co., Fort Wayne, Ind.
- Tri-Flux**—Soldering Flux. Wolfe-Kote Co., Sheboygan, Wis.
- Trimtherm**—Thermostats. General Controls Co., Glendale, Calif.
- Triple A**—Paints, Enamels and Lacquers, Compounds. Quigley Co., Inc., New York, N. Y.
- Triple Drain**—Channel Roofing. Republic Steel Corp., Cleveland, O.
- Triple Lock**—Roofing Nails. The Deniston Co., Chicago, Ill.
- Triple-Mix**—Furnace Cement. J. H. Krehbiel Co., Chicago, Ill.
- Triplex**—Furnaces. Home Furnace Co., Holland, Mich.
- Triplife**—Furnaces. Williamson Heater Co., Cincinnati, O.
- Triptrol**—Controls. White Mfg. Co., St. Paul, Minn.
- Triumph**—Furnaces. Joseph Capps, Inc., South Gate, Calif.
- Trojan**—Furnaces and Stokers. Auburn Burner Co., Auburn, Ind.
- Trojan**—Ventilators. Danzer Metal Works Co., Hagerstown, Md.
- Tropic Breeze**—Furnaces. Dalzen Tool & Manufacturing Co., Detroit, Mich.
- Trudex**—Thermostatic Bi-Metals. General Plate Div. Metals & Controls Corp., Attleboro, Mass.
- Tufferneil**—Paint. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
- Tulox**—Plastic Tubing. Extruded Plastics, Inc., Norwalk, Conn.
- Turbo**—Air Washers. Bayley Blower Company, Milwaukee, Wis.
- Turbo-Lift**—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
- Turbovane**—Blowers. B. F. Sturtevant Co., Boston, Mass.
- Turret**—Water Circulating Pumps. Yeomans Bros. Co., Chicago, Ill.
- 20th Century**—Bearings. Roller Bearing Co. of America, Trenton, N. J.
- Twin Contact**—Controls, Relays, Thermostats. Perflex Corporation, Milwaukee, Wis.
- Twin Control**—Oil Burners. H. J. Huelier Mfg. Co., Inc., Brooklyn, N. Y.
- Twin-Fyre**—Oil Burner. Aldrich Co., Wyoming, Ill.

Two-Way—Pneumatic Air Hammer. Superior Flux Co., Cleveland.

Two-Way—Pneumatic Hammer. Coast Pneumatic Tool Co., Los Angeles.

Tygon—Metal Protecting Paint. U. S. Stoneware Co., Akron, Ohio.

Tyl-Lyke—Steel Roofing and Siding. Continental Steel Corp., Kokomo, Ind.

Type X—Stainless Cleaner. Turco Products, Inc., Los Angeles, Calif.

Tytecote—Reflective Blanket Insulation. Specialty Converters, Inc., East Braintree, Mass.

U

U.S.—Pipe Fittings, Grilles, and Registers. United States Register Co., Battle Creek, Mich.

USG—Built-Up Roofing and Roof Cement and Paint. United States Gypsum Co., Chicago, Ill.

U.S.S.—Nails, Roofing, Sheets, Plates, Wire. Subsidiaries, U. S. Steel Corporation.

U.S.S. American—Nails. American Steel & Wire Co., Cleveland, O.

U.S.S. Carilloy—Alloy Plates. Carnegie-Illinois Steel Corp., Pittsburgh, Pa.

U. S. S. Columbia—Roofing, Sheets. Columbia Steel Co., San Francisco, Calif.

U.S.S. Paintbond—Sheets. Carnegie-Illinois Steel Corporation, Pittsburgh, Pa.

U.S.S. Stormseal—Steel Roofing. Carnegie-Illinois Steel Corp., Pittsburgh, Pa.

U.S.S. Tennesseal—Roofing. Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

U.S.S. Vitrenamel—Sheets. Carnegie-Illinois Steel Corporation, Pittsburgh, Pa.

Uclon—Coatings and Paint. United Chromium, Incorporated, New York City.

U-in-Tah—Paint. American-Marietta Co., Chicago.

U-Loy—Sheets. Republic Steel Corp., Cleveland, O.

UMCO—Furnaces. Union Manufacturing Co., Boyertown, Pa.

"U" Tube—Water Heaters. Handley Brown Heater Co., Jackson, Mich.

Unamatic—Automatic Shielded Arc Welding. Una Welding, Inc., Cleveland, O.

Uniduct—Prefabricated Ducts. General Heating Products Co., Minneapolis, Minn.

Unifil—Insulation. Robinson Insulation Co., Great Falls, Mont.

Uni-Fin—Grilles and Warm Air Registers. Barber-Colman Co., Rockford, Ill.

Uniflex—Roofing Paint. Acorn Refining Co., Cleveland, O.

Uni-flu—Duct Turning Vanes, Grilles and Registers. Barber-Colman Company, Rockford, Ill.

Unilloy—Stainless Steel Sheets. Universal-Cyclops Steel Corp., Bridgeville, Pa.

Unipack—Blowers, Exhausters. American Machine Products Co., Marshalltown, Iowa.

Unique—Air Conditioning Furnace. Excelsior Steel Furnace Co., Chicago, Ill.

Unishear—Portable Electric Shears. Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.

Unisorb—Bases and Pads and Duct Insulation. Felters Co., Boston, Mass.

Unitaire—Air Conditioning Units for Stores. Westinghouse Electric & Mfg. Co., East Springfield, Mass.

Uni-Therm—Air Cond. Furnace. Utility Appliance Corp., Los Angeles, Calif.

Universal—Angle Benders. Hossfeld Mfg. Co., Winona, Minn.

Universal—Bases. Vibration Control Company, New York City.

Universal—Dial Damper. Parker-Kalon Corp., New York, N. Y.

Unxld—Damper Quadrants. Parker-Kalon Corp., New York, N. Y.

Upson—Rivets, Bolts. Republic Steel Corp., Cleveland, O.

usAIRco—Air Conditioning Units, Blowers and Blower-Filter Units. Coils, Fans, Grilles, Washers and Blower Wheels. U. S. Air Conditioning Corp., Minneapolis.

Utilus—Kitchen Exhaust and Ventilating Fans. W. F. Hirschman Co., Inc., Buffalo, N. Y.

V

V-Vent—Ventilators. Aeolus Dickinson, Chicago, Ill.

Vacu-Draft—Forced Draft Blowers. Muncie Gear Works, Inc., Muncie, Ind.

Valcalox—Damper Regulators. Young Regulator Co., Cleveland, O.

Valdurn—Caulking Compounds, Paint. American-Marietta Co., Chicago, Ill.

Valley Forge—Cement. Ehret Magnesia Mfg. Co., Valley Forge, Pa.

Vapoglas—Humidifier Evaporating Plates. Skuttle Mfg. Co., Detroit, Mich.

Vaporator—Humidifiers. Rudy Furnace Co., Dowagiac, Mich.

Vedoc—Enamels. Ferro Enamel Corp., Cleveland, O.

Veetjet—Nozzles. Spraying Systems Co., Chicago.

Veelos—Adjustable V-Belts. Manheim Mfg. & Belting Co., Manheim, Pa.

Velometer—Anemometers. Illinois Testing Laboratories, Inc., Chicago, Ill.

Venetian—Cement Paint. E. D. Coddingtong Mfg. Co., Milwaukee, Wis.

Venetian—Roofing Paint. Clinton Metallic Paint Co., Clinton, N. Y.

Ventura—Fans, Ventilators. American Blower Corp., Detroit, Mich.

Venturi-Flu—Air Diffusers, Ceiling Ventilators, Duct Turning Vanes. Barber-Colman Company, Rockford, Ill.

Vernois—Furnaces and Heaters. Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.

Versa-Tool—Portable Electric Drill. York Electric and Machine Co., York, Pa.

Vertivent—Ventilators. Young Radiator Co., Racine, Wis.

Vibracork—Bases. Armstrong Cork Co., Lancaster, Pa.

Vibro-Bars—Vibration Isolating Bases. Korfund Co., Inc., Long Island City.

Vibro-Dampers—Vibration Isolating Bases. Korfund Co., Inc., Long Island City.

Vibro-Insulators—Vibration Insulating Pads. B. F. Goodrich Co., Akron, O.

Vibro-Isolator—Vibration Isolating Bases. Korfund Co., Inc., Long Island City.

Victor—Blower-Filter Units, Furnaces, Humidifiers, Oil Burners, Stokers, Hall-Neal Furnace Co., Indianapolis, Ind.

Victorair—Winter Air Conditioners. Hall-Neal Furnace Co., Indianapolis, Ind.

Victorgas—Gas Units. Hall-Neal Furnace Co., Indianapolis, Ind.

Victor Jumbo—Large Furnaces. Hall-Neal Furnace Co., Indianapolis, Ind.

Victoroll—Air Conditioning Furnaces. Hall-Neal Furnace Co., Indianapolis, Ind.

Victorstoke—Stoker Units. Hall-Neal Furnace Co., Indianapolis, Ind.

Victory—Oil Burners. Caloroll Burner Corp., Hartford, Conn.

Victory—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Vigorair—Furnaces. Marshall Furnace Co., Marshall, Mich.

Vincul—Rustproofing. Protective Coatings, Inc., Detroit.

Visaflame—Oil Burner Controls. Mercold Corp., Chicago, Ill.

Vitalaire—Portable Room Cooler. Ice Cooling Appliance Corp., Morrison, Ill.

Vitra-Carlite—Enamels and Lacquers. Hilo Varnish Corp., Brooklyn, N. Y.

Vitriset—Furnace Cement. U. S. Stoneware Co., Akron, Ohio.

Vitrollner—Vent and Flue Pipe and Fittings. Condensation Engineering Corp., Chicago, Ill.

Volcano—Chimney Caps and Tops, Ventilators. Iwan Brothers, South Bend, Ind.

Volocitrol—Stack-Head Damper. Barber-Colman Co., Rockford, Ill.

Vortex—Furnace Vacuum Cleaners. B. F. Sturtevant Co., Hyde Park, Boston, Mass.

Vortex—Spray Nozzles. Phillips Cooling Tower Co., Inc., New York City.

Vulcanite—Roofing, and Roofing Cement. Certain-teed Products Corp., New York City.

Vulcentex—Caulking and Glazing Compounds. A. C. Horn Co., Long Island City, N. Y.

Vulco—V-type Belts and Pulleys. Gates Rubber Co., Denver, Colo.

Vulco Etch—Welding Compounds. Turco Products, Inc., Los Angeles, Calif.

W

WAW—Tools. W. A. Whitney Mfg. Co., Rockford, Ill.

WHS—Couplings, Pulleys. Winfield H Smith, Inc., Springfield, N. Y.

W. O. No. 1—Rust Preventive Chemicals. Turco Products, Inc., Los Angeles, Calif.

Wareo—Refractories. Walsh Refractories Corp., St. Louis, Mo.

Ward Zephyr—Attic Fans. Edgar T. Ward Co., Inc., River Forest, Ill.

Warrior—Furnaces. Dowagiac Steel Furnace Co., Dowagiac, Mich.

Watero—Spray Nozzles. Water Cooling Corp., New York City.

Waterbase—Furnaces. Farris Furnace Co., Springfield, Ill.

Water-Boy—Humidifier Valves. Maid-O'-Mist, Inc., Chicago, Ill.

Waterbury — Oil Burners, Cabinets, Casings, Ducts and Fittings, Pipe, Pipe Fittings and Accessories, Furnaces and Heaters. Waterman-Waterbury Co., Minneapolis, Minn.

Water-RAY-trols — Oil-fired Water Heater. Ray Oil Burner Co., San Francisco, Calif.

Waterseal—Cement. Thompson & Co., Pittsburgh, Pa.

Waterspar—Enamels and Lacquers. Pittsburgh Plate Glass Co., Pittsburgh.

Watertender—Humidifier Valve. Skuttle Mfg. Co., Detroit, Mich.

Wearweld — Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Wearwell — Paint. Thompson & Co., Pittsburgh, Pa.

Weathercote — Waterproofing Compounds. Glidden Co., Cleveland, O.

Weathermakers — Air Conditioning Units. Carrier Corp., Syracuse, N. Y.

Weather-Seal — Roof Cement. Acme White Lead & Color Works, Detroit, Mich.

Weatherwood — Insulation. United States Gypsum Co., Chicago, Ill.

Webster—Spray Nozzles and Air Washers. W. J. Strandwitz & Co., Inc., Camden, N. J.

Wedgbelt—Belts and Pulleys. American Pulley Co., Philadelphia, Pa.

Weir — Air Conditioning Furnaces, Gravity Furnaces, Heaters, Humidifiers, Stokers. Meyer Furnace Co., Peoria, Ill.

Weirlead—Sheets. Weirton Steel Co., Weirton, W. Va.

Weircoloy—Copper Bearing Galvanized Sheets. Weirton Steel Co., Weirton, W. Va.

Weirite—Tin Plate. Weirton Steel Co., Weirton, W. Va.

Weir-Meyer Heat—Furnaces. Meyer Furnace Co., Peoria, Ill.

Weirzin — Electrolytic Zinc Coated Sheets. Weirton Steel Co., Weirton, W. Va.

Weisco — Skylight Lifts. H. Weiss & Co., New York, N. Y.

Weld-Craft — Welders. Allied Weld-Craft, Inc., Indianapolis, Ind.

Weldon—Furnaces. McPherson Furnace & Supply Co., Portland, Ore.

Weld-o-trol—Spot Welders. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Weld-O-Trol—Arc Welders. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Wellsville Savage—Fire Brick. Chicago Fire Brick Co., Chicago, Ill.

Wesco — Blower Filters. Northwest Stove & Furnace Works, Inc., Portland, Ore.

Wesco — Furnaces. John Westwick & Son, Inc., Galena, Ill.

Wesco Diamond—Furnaces. Northwest Stove & Furnace Works, Portland, Ore.

Wesco Duplex—Utility Room Furnaces. Northwest Stove & Furnace Works, Portland, Ore.

Wesco Hiboy — Furnaces. Northwest Stove & Furnace Works, Inc., Portland, Ore.

Wesco—Furnaces. General Wesco Stove Co., Springfield, Mo.

West Wind—Window Fans. American Metal Products Co., Fort Worth, Tex.

Western Fan — Roof Fan Ventilators. Western Engineering & Mfg. Co., Los Angeles, Calif.

Western King—Furnaces. Independence Stove & Furnace Co., Independence, Mo.

Western Turbine—Gravity Roof Ventilators. Western Engineering & Mfg. Co., Los Angeles, Calif.

Westernaire Exhausters—Ventilating Fans. Western Engineering & Mfg. Co., Los Angeles, Calif.

Wetoll—Soldering Flux. Farrelloy Co., Inc., Philadelphia.

Whirlcone — Spray Nozzles. Water Cooling Equipment Corp., St. Louis, Mo.

Whirljet — Spray Nozzles. Spraying Systems Co., Chicago, Ill.

Whitney-JENSEN — Angle Benders, Brakes, Elbow and Pittsburgh Lock Forming Machines, Punches, Shears and Tools. Whitney Metal Tool Co., Rockford, Ill.

Whis—Electric Drills. Paramount Products Co., New York City.

Wiechert—Furnaces, Heaters. St. Clair Foundry Corp., Centralia, Ill.

Wilhelm — Furnace Cement. Glidden Co., Cleveland, O.

Wilson — Arc Welders. Air Reduction Sales Company, New York City.

Wilson—Furnace Brushes. Worcester Brush & Scraper Co., Worcester, Mass.

Winair — Fans. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Winco—Harold W. Winningham & Company, Seattle.

Wind Electric—Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Wind-O-Fan, Jr.—Window Ventilating Fan. Chelsea Fan & Blower Co., Inc., Irvington, N. J.

Wind-O-Vane Jr.—Kitchen Exhaust Fans. B. F. Sturtevant Co., Hyde Park, Mass.

Wind-O-Vent—Ventilator Units. Reed Unit-Fans, Inc., New Orleans, La.

Windowstat—Condensation Control. Fries Instrument Div., Towson, Md.

Winkler—Stokers. U. S. Machine Corporation, Lebanon, Ind.

Winner—Gravity Registers. Auer Register Co., Cleveland, O.

Winter-Chaser — Air Conditioning Units, Furnaces, Heaters. Campbell Heating Co., Des Moines, Ia.

Winter King — Furnaces. McPherson Furnace & Supply Co., Portland, Ore.

Wire-Klad — Filters. Dollinger Corporation, Rochester, N. Y.

Wisco—Grilles and Gas Welding Rod. Wire Cloth. Wickwire Spencer Steel Co., New York City.

Witch—Bolts. Carpenter & Paterson, Inc., East Boston, Mass.

Wizard — Furnaces. Agricola Furnace Co., Inc., Gadsden, Ala.

Wolfe—Angle Meter, Circle Meter, Divisor, Protractor. Interstate Sales Co., New York City.

Wolverine—Fans, Exhausters, Ventilators. Belanger Fan & Blower Co., Detroit, Mich.

Wolverine—Furnaces. Marshall Furnace Co., Marshall, Mich.

Woolfelt—Duct Insulation. Norristown Magnesla & Asbestos Co., Norristown, Pa.

X

XL — Metal Windows. Herrmann & Grace Co., Brooklyn, N. Y.

X-L-All — Furnaces. Deshler Foundry & Machine Works, Deshler, Ohio.

Xit—Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.

X-Pandoseal—Transparent Waterproofing. X-Pando Corp., Long Island City.

Y

Yager's — Flux. Alex R. Benson Co., Inc., Hudson, N. Y.

Yankee — Damper Clips and Tips. Howes-Woods Company, Cambridge, Mass.

Yankee — Damper Regulators. Ohio Products Co., Cleveland, O.

YarWay—Nozzles. Yarnall-Waring Co., Philadelphia, Pa.

Yearound — Air Conditioning Units. Conditionaire Unit Co., Chicago, Ill.

Yeloy — Plates. Youngstown Sheet & Tube Co., Youngstown, Ohio.

Yorkaire Conditioners—Air Conditioning Units. York Corp., York, Pa.

Yorkaire Heat—Furnaces. York Corp., York, Pa.

YouBert — Collectors and Blow Pipe Fittings. Young & Bertke Co., Cincinnati, O.

Z

ZTO Chromate—Metal Protecting Paint. New Jersey Zinc Co., New York City.

Zeph-Air—Gas Furnace. XXth Century Heating & Ventilating Co., Akron, O.

Zephair — Air Conditioning Units, Window Fans. American Metal Products Co., Fort Worth, Tex.

Zeph-O-Cone—Diffusers. Waterloo Register Co., Waterloo, Ia.

Zeph-Oil-Ator — Air Conditioning Furnaces. Century Engineering Corp., Cedar Rapids, Ia.

Zephyr—A. C. Stoker Furnace. Premier Furnace Co., Dowagiac, Mich.

Zephyr — Humidifiers. Mald-O'-Mist, Inc., Chicago, Ill.

Zephyrplane — Sander. Skilsaw, Inc., Chicago, Ill.

Zephyrplane, Jr.—Sander. Skilsaw, Inc., Chicago.

Zero—Furnace and Insulating Cement and Refractories. Standard Fuel Engineering Co., Detroit, Mich.

Zilloy—Zinc Roofing. New Jersey Zinc Co., New York City.

Zinc Chromate Primer—Metal Protecting Paint. Hilo Varnish Corp., Brooklyn, N. Y.

Zinegrip—Steel Sheets. American Rolling Mill Co., Middletown, O.

Zoneair—Furnaces. Payne Furnace & Supply Co., Inc., Beverly Hills, Calif.

Zonolite — Cement Combustion Chambers, Insulation and Refractories. Universal Zonolite Insulation Co., Chicago, and Munn and Steel, Inc., Newark, N. J.

Zonolite—Insulation. Robinson Insulation Co., Great Falls, Mont.

Zonolite—Insulation. Western Mineral Products Co., Omaha, Nebr.

Z-Ro King—Furnaces. Oakland Foundry Co., Belleville, Ill.

Zura — Roofing Paint. L. Sonneborn Sons, Inc., New York City.

Section of

American Artisan

1945 DIRECTORY OF WARM AIR HEATING, RESIDENTIAL AIR CONDITIONING AND SHEET METAL PRODUCTS

[Section 3—MANUFACTURERS' ADDRESSES]

A

- A-C Mfg. Co., Inc., 417 Sherman Ave., Pontiac, Ill.
- A-J Manufacturing Co., 2119 Washington St., Kansas City, Mo.
- A & J Company, 844 W. 59th St., Chicago 21.
- Abbott Mfg. Co., Drawer 150, Painesville, O.
- Acadia Synthetic Products Div., Western Felt Works, 4115 Ogden Ave., Chicago.
- Accurate Mfg. Works, 2336-38 Milwaukee Ave., Chicago 47.
- Accurate Metal Weather Strip Co., 216 E. 26th St., New York City 10.
- Acer & Whedon, Inc., Commercial St., Medina, N. Y.
- Ackermann Manufacturing Company, Wheeling, W. Va.
- Acme Asbestos Covering & Flooring Co., 222 Elizabeth St., Chicago 7.
- Acme Electric Welder Co., 2618 Fruitland Rd., Los Angeles 11.
- Acme Industries, Inc., Mechanic & Ganson Sts., Jackson, Mich.
- Acme Oil Burner Co., Inc., 210 Third Ave., S. W., Cedar Rapids, Ia.
- Acme Refining Co., W. 56th & W&LE Ry., Cleveland.
- Acme Tin Plate & Roofing Supply Co., 3rd & Westmoreland Sts., Philadelphia 40.
- Acme White Lead & Color Works, 3250 St. Aubin Ave., Detroit.
- Acorn Refining Co., 8001 Franklin Blvd., Cleveland 2.
- Adams Co., The, East 4th St., Dubuque, Ia.
- Adams Mattress Factory, Fort Worth, Texas.
- Adelta Manufacturing Co., Ellsworth St. at 21st, Philadelphia 46.
- Advance Aluminum Castings Corp., 2742 W. 36th Pl., Chicago 32.
- Advance Appliance Co., Inc., 805-810 S. Washington St., Peoria, Ill.
- Advance Electric and Relay Co., 1260 W. 2nd St., Los Angeles 26.
- Advance Fan & Blower Co., 3425 Bagley, Detroit.
- Advance Insulating Co., 714 Magee Bldg., Pittsburgh.
- Aeolus Dickinson, 3320 S. Artesian Ave., Chicago 8.
- Aerofin Corp., 410 S. Geddes St., Syracuse, N. Y.
- Aeroll Burner Co., Inc., Park Ave. at 57th St., West New York, N. J.
- Aerolup Corp., East St., Jackson, Mich.
- Aerovent Fan Co., 710 E. Ash St., Piqua, O.
- Aget-Detroit Co., 602 First National Bank Bldg., Ann Arbor, Mich.
- Agnew Electric Co., Milford, Mich.
- Agricola Furnace Co., Inc., North 12th St., Gadsden, Ala.
- Ahlberg Bearing Co., 3025 W. 47th St., Chicago 32.
- Air Conditioning Equip. Co., P. O. Box 1123, Minneapolis 1.
- Air Conditioning Products Co., 1230 Eighteenth St., Detroit 16.
- Air Conditioning and Refrigeration Div., Worthington Pump & Machinery Corp., Harrison, N. J.
- Air Conditioning & Stokers, Inc., 1610 Tower Grove Ave., St. Louis.
- Air Control Products, Inc., Coopersville, Mich.
- Air Controls, Inc., 2310 E. Superior Ave., Cleveland 14.
- Air Devices, Inc., 17 E. 42nd St., New York City.
- Alrecon Industries Incorporated, 2536 Fourteenth St., Detroit 16.
- Air Filter Engineering Co., 2446 S. Parkway, Chicago 16.
- Alre-Folle Fan & Blower Co., 4737 W. Vernor Highway, Detroit.
- Alrgard Manufacturing Co., 609 N. La Salle St., Chicago 10.
- Airmaster Corp., 4317 Ravenswood Ave., Chicago.
- Air-Maze Corp., 5290 Harvard Ave., Cleveland 5.
- Air-O-Cell Industries, Inc., 11616 Cloverdale Ave., Detroit.
- Air-O-Fin Grille Co., 16195 Meyers Road, Detroit 27.
- Air Reduction Sales Co., 60 E. 42nd St., New York City 17.
- Air & Refrigeration Corp., 475 Fifth Ave., New York City 17.
- Air Stream Filter Corp., 2100 Washington Ave., St. Louis 3.
- Airtemp Div. Chrysler Corp., Third Natl. Bk. Bldg., Dayton 2, Ohio.
- Airtherm Mfg. Co., 711 S. Spring Ave., St. Louis 10.
- Airwasher Corporation, 1122 N. Washington Ave., Lansing, Mich.
- Ajax Building Bracket Co., 1551 Rydal-Mount Rd., Cleveland Heights, O.
- Ajax Flexible Coupling Co., Westfield, N. Y.
- Aladdin Heating Corp., 2222 San Pablo Ave., Oakland, Calif.
- Albertson & Co., Inc., Sioux City, Iowa.
- Albright Equipment Co., 100 Station St., Johnstown, Pa.
- Alco Manufacturing Co., 2619 Milam St., Houston, Tex.
- Alden Manufacturing Co., Painesville, Ohio.
- Aldrich Co., Wyoming, Ill.
- Aldrich Pump Co., Foot of Pine St., Allentown, Pa.
- Alfol Insulation Co., Inc., 155 E. 44th St., New York City.
- Allegheny Ludlum Steel Corp., P. O. Box F, Brackenridge, Pa.
- Allen Billmyre Co., 431 Fayette Ave., Mamaroneck, N. Y.
- Allen-Bradley Co., 1335 S. First St., Milwaukee, Wis.
- Allen, Inc., Charles L., Pequabuck, Conn.
- Allen Co., Inc., L. B., 6702 Bryn Mawr Ave., Chicago 31.
- Allen Corp., 9752 Erwin, Detroit 13.
- Allied Heating & Air Conditioning Co., 14807 Condon Ave., Lawndale, Calif.
- Allied Weld-Craft, Inc., 401 W. South St., Indianapolis 4.
- Allington & Curtis Mfg. Co., 1500 Holland Ave., Saginaw, Mich.
- Allis-Chalmers Manufacturing Company, Milwaukee 1.
- Allis Co., Louis, 427 Stewart St., Milwaukee 7.
- Allmetal Weatherstrip Co., 229 W. Illinois St., Chicago.
- Allred Manufacturing Company, Inc., 2154 N. Sherman Dr., Indianapolis.
- All States Roofers Equipment & Material Co., 2107 W. Lake St., Chicago.
- Alpha Metals, Inc., 363 Hudson Ave., Brooklyn 1.
- Alphil Spot Welding Co., 431 W. Broadway, New York City 12.
- Alton Mineral Wool Insulation Co., P. O. Box 34, Alton, Ill.
- Aluminum Co. of America, 801 Gulf Bldg., Pittsburgh 19.
- Aluminum Goods Mfg. Co., Manitowoc, Wis.
- American Agile Corporation, 5806 Hough Ave., Cleveland 3.
- American Air Conditioning Co., 2831 Thirteenth Ave., Minneapolis.
- American Air Conditioning Co., Boulevard Bldg., Detroit.
- American Air Conditioning Corp., P. O. Box 29, Sebastopol, Calif.
- American Air Filter Co., Inc., 113 Central Ave., Louisville 8, Ky.
- American Blower Corp., Detroit 32.
- American Brass Co., 414 Meadow St., Waterbury 88, Conn.
- American Cabinet Hardware Corp., Rockford, Ill.
- American Chain Division, American Chain & Cable Co., Inc., York, Pa.
- American Chemical Paint Co., Brookside Ave., Ambler, Pa.
- American Coal Burner Co., 12-20 E. Erie St., Chicago 11.
- American Colls, Inc., 25-27 Lexington St., Newark 5, N. J.
- American Coolair Corp., 3604 Mayflower St., P. O. Box 2300, Jacksonville 3, Fla.
- American Cooling Tower Co., 2710 McGee St., Kansas City, Mo.
- American Emblem Co., Inc., P. O. Box 116M, Utica 1, N. Y.
- American Excelsior Corp., 100-20 N. Halsted St., Chicago.
- American Flange & Mfg. Co., Inc., 1901 RCA Bldg., Radio City, New York City 10.
- American Flexible Coupling Co., 1801 Pittsburgh Ave., Erie, Pa.
- American Foundry Equipment Co., 621 Byrkit St., Mishawka, Ind.
- American Foundry & Furnace Co., Washington at McClun St., Bloomington, Ill.
- American Furnace Co., 2719-31 Delmar Blvd., St. Louis 3.
- American Furnace & Foundry Co., Box 198, Milan, Mich.
- American Gas Furnace Co., 140 Spring St., Elizabeth, N. J.
- American Gas Machine Co., 505 Front St., Albert Lea, Minn.
- American Hair & Felt Co., 222 N. Bank Dr., Chicago 54.
- American Instrument Co., 8010 Georgia Ave., Silver Spring, Md.
- American Insulator Corp., New Freedom, Pa.
- American-Larson Ventilating Co., 1004 Keystone Bldg., Pittsburgh 22, Pa.
- American Machine Products Co., 401 S. Third Ave., Marshalltown, Ia.
- American-Marietta Company, 43 E. Ohio St., Chicago 11.
- American-Marsh Pumps, Inc., 60 Capital Ave., N. E., Battle Creek, Mich.
- American Metal Hose Branch, American Brass Co., 67 Jewelry St., Waterbury 88, Conn.
- American Metal Products Co., 730 Hudgins St., Fort Worth 9, Tex.
- American Metal Weather Strip Co., 114 N. Division Ave., Grand Rapids 2, Mich.
- American Moistening Co., 260 W. Exchange St., Providence 1, R. I.
- American Nickeloid Co., 1505 Second St., Peru, Ill.
- American Pulley Co., 4200 Wissahickon Ave., Philadelphia 29.
- American Radiator & Standard Sanitary Corp., P. O. Box 1226, Pittsburgh 22.

• Advertisement in this issue. See Index to Advertisers, page 324.

- American Rolling Mill Co., 703 Curtis St., Middletown, O.
- American Screw Co., 21 Stevens St., Providence, R. I.
- American Sheet Metal Works, 331 N. Alexander, New Orleans 1.
- American Smelting & Refining Co., 120 Broadway, New York 5.
- American Solder & Flux Co., 2152 East Norris St., Philadelphia.
- American Steel Band Co., Box 565, Pittsburgh 30.
- American Steel & Wire Co., 614 Superior Ave., N. W., Cleveland 13.
- American Stove Co., Lorain Div., 1200 Long Ave., Lorain, O.
- American Warming & Ven. Co., 1017 Summit St., Toledo 4.
- American Zinc Products Co., Greencastle, Ind.
- Ames Co., W. R., 150 Hooper St., San Francisco 7.
- Amirton Co., 149 Broadway, New York City 6.
- Anchor Post Fence Co., Heating Div., Eastern Ave. & Kane St., Baltimore 24, Md.
- Anchor Stove & Range Co., Div. Stratton & Terstegge Co., Third & Culbertson, New Albany, Ind.
- Andersen Corp., Bayport, Minn.
- Andes Range & Furnace Corp., 117 Evans St., Geneva, N. Y.
- Andrews Heating Co., 117-199 Main St., S. E., Minneapolis 14.
- Anemostat Corp. of America, 10 E. 39th St., New York City 16.
- Angell Nail & Chaplet Co., 4580 E. 71st St., Cleveland, O.
- Angier Corp., Framingham, Mass.
- Anti-Corrosive Metal Products Co., Inc., P. O. Box 788, Albany, N. Y.
- Antigo Building Supply Co., 817 Fulton St., Antigo, Wis.
- Apfel & Co., 928 S. Ninth St., Hamilton, O.
- Apollo Metal Works, 66th Pl. & S. Oak Park Ave., Clearing Sta., Chicago 38.
- Apollo Steel Co., 609-617 Warren Ave., Apollo, Pa.
- April Showers Co., 4126 Eighth St., N. W., Washington 11.
- Aqua-Mist Co., 426 Jefferson St., Topeka, Kan.
- Aqua-Sorb Co., 21 S. 16th St., East Orange, N. J.
- Arco Corp., 401 N. Broad St., Philadelphia 8.
- Arcweld Mfg. Co., Inc., 3469 Third Ave. W., Seattle 99, Wash.
- Arex Co., 333 N. Michigan Ave., Chicago.
- Armstrong-Blum Mfg. Co., 5700 Bloomingdale Rd., Cragin Sta., Chicago.
- Armstrong Co., 241 S. Post St., Detroit 17.
- Armstrong Cork Co., 4400 Concord St., Lancaster, Pa.
- Armstrong Furnace Co., 1649 Olentangy River Rd., Columbus 3, O.
- Arrow-Hart & Hegeman Elect. Co., 103 Hawthorne St., Hartford 6, Conn.
- Asphalt Products Co., Inc., Eastwood Sta., Syracuse, N. Y.
- Associated Heater Parts Co., 2807 S. LaSalle St., Chicago.
- Associated Southern Industries, 1161 Union Ave., Memphis, Tenn.
- Atcheson Glass Co., T. J., 955 Main St., Buffalo, N. Y.
- Atkins & Co., E. C., 402 S. Illinois St., Indianapolis 9, Ind.
- Atlantic Metal Hose Co., Inc., 123 W. 64th St., New York 23.
- Atlantic Steel Co., P. O. Box 1714, Atlanta 1, Ga.
- Atlas Bolt & Screw Co., 1130 Ivanhoe Rd., Cleveland, O.
- Atlas Machine & Tool Co., 115 N. Goring St., Portland 11, Ore.
- Atlas Valve Co., 282 South St., Newark, N. J.
- Atlas Welding Accessories Co., 14820 Wyoming Ave., Detroit 21.
- Auburn Burner Co., Lock Box 269, Auburn, Ind.
- Auburn Foundry, Inc., Stoker Div., Lock Box 471, Auburn, Ind.
- Audubon Wire Cloth Corp., Allen St. & Castor Ave., Philadelphia.
- Auer Register Co., 3608 Payne Ave., Cleveland 14.
- Au-Temp-Co Corp., 521 Fifth Ave., New York City 17.
- Autoforce Ventilating System, 244 Washington St., Boston 8.
- Autogas Co., 2258 Diversey Ave., Chicago 47.
- Auto-Heat Corp., 311 W. 66th St., New York City.
- Automatic Burner Corp., 1823 Carroll Ave., Chicago 12, Ill.
- Automatic Gasflux Mfg. Co., 198 Wayne St., Mansfield, O.
- Automatic Humidifier Co., 19th & Main Sts., Cedar Falls, Ia.
- Automatic Products Co., 2450 N. 32nd St., Milwaukee 10, Wis.
- Automatic Pump & Softener Corp., Rockford, Ill.
- Automatic Switch Co., 41 E. 11th St., New York City 3.
- Automatic Temperature Control Co., Inc., 44 E. Logan St., Philadelphia 44.
- Automatic Ventilator Co., 503 S. Shiawassee, Corunna, Mich.

B

B/W Controller Corp., 2200 E. Maple Ave., Birmingham, Mich.

Babbitt-Barber Asphalt Products, Inc., Madison, Ill.

Babbitt Industrial Specialties Co., 630 Fifth Ave., New York 20, N. Y.

Babcock & Wilcox Co., 85 Liberty St., New York City 6.

Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh, Pa.

Bache & Co., Semon, Greenwich & Morton Sts., New York 14.

Badger Mfg. Co., 106 N. Frances St., Madison, Wis.

Badger Corporation, 327 E. Brown St., Milwaukee 12, Wis.

Baer Brothers, 438 W. 37th St., New York City 19.

Bahnson Co., 1001 S. Marshall St., Winston-Salem, N. C.

Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, O.

Baker Furnace & Cleaner Mfg. Co., 2152 Smead Ave., Toledo, O.

Baker Ice Machine Co., Inc., 1509 Evans St., Omaha, Nebr.

Baldor Electric Co., 4358 Duncan Ave., St. Louis, Mo.

Baldwin Belting, Inc., 85 Chambers St., New York 7.

Baldwin-Hill Co., 527 Klagg Ave., Trenton 2, N. J.

Ballantyne Co., 222 N. 16th St., Omaha 2, Nebr.

Balloffett Dies & Nozzle Co., Inc., 6825 Adams St., Guttenberg, N. J.

Baltimore Enamel and Novelty Co., P. O. Box 928, Baltimore 3, Md.

Banner Repair Parts Co., 103 E. Indianola Ave., Youngstown, O.

Bantam Bearings Div., Torrington Co., South Bend 21, Ind.

Barber Co., Inc., 1600 Arch St., Philadelphia.

Barber-Colman Co., River & Loomis Sts., Rockford, Ill.

Barber Gas Burner Co., 3704 Superior Ave., Cleveland 14.

Barclay, Inc., Robt., 128 N. Peoria St., Chicago, Ill.

Barco Mfg. & Sales Co., 2450 E. 23rd St., Los Angeles, Calif.

Bard Mfg. Co., Evansport Road, Bryan, O.

Bardes Range & Foundry Co., E. H., 2619 Colerain Ave., Cincinnati, O.

Barger Sheet Metal Co., 12401 Euclid, Cleveland.

Barland Weatherstrip Material Co., 1960 E. 59th St., Cleveland 3, O.

Barnes Metal Products Co., 4425 W. 16th St., Chicago.

Barnes, W. O., 1297 Terminal Ave., Detroit 14.

Barrett Division, Allied Chemical & Dis. Corp., 40 Rector St., New York City 6.

Barrett Engineers, 1322 Warrensville Center Rd., Cleveland Heights 21, O.

Barry Furnace Co., 208 N. B St., Hamilton, O.

- Barth Manufacturing Co., Milldale, Conn.
- Bartlett Hayward Co., 200 Scott St., Baltimore.
- Bartlett Mfg. Co., 3003 E. Grand Blvd., Detroit 2.
- Bastian-Blessing Co., 4201 W. Peterson Ave., Chicago 30.
- Bastian-Morley Co., Inc., LaPorte, Ind.
- Bath Co., Cyril, E. 70th & Machinery Ave., Cleveland 8.
- Bayer Co., A. J., Slauson & Santa Fe Aves., Los Angeles.
- Bayley Blower Co., 1817 S. 66th St., Milwaukee 14.
- Beacon-Morris Corp., 110-114 Brookline Ave., Boston 15.
- Bead Chain Mfg. Co., 110 Mountain Grove St., Bridgeport 5, Conn.
- Bear Mfg. Co., Industrial Div., 2030 Fifth Ave., Rock Island, Ill.
- Bearing Co. of America, 501 Harrisburg Ave., Lancaster, Pa.
- Beatrice Steel Tank Mfg. Co., 700 S. 7th St., Beatrice, Nebr.
- Beatty Machine & Mfg. Co., 932 150th St., Hammond, Ind.
- Beck Engineering Combustion Kompany, 2100 Cole St., St. Louis 6.
- Beckett Engineering Co., R. W., W. Kiver St., Elyria, O.
- Beckett & Co., Thomas, 2118 Griffin St., Dallas 2, Texas.
- Beckley Perforating Co., 305 North Ave., Garwood, N. J.
- Belanger Fan & Blower Co., 1230 18th St., Detroit 16.
- Belco Exhaust Fan Mfg. Co., 3830-32 Olive St., St. Louis 8.
- Belden Machine Co., 1108 Whalley Ave., New Haven 15, Conn.
- Belfield Co., H., 435 N. Broad St., Philadelphia 23.
- Bell & Gossett Co., 8200 N. Austin Ave., Morton Grove, Ill.
- Belmont Smelting & Refining Works, Inc., 281 Georgia Ave., Brooklyn 7, N. Y.
- Benjamin Air Rifle Co., 1527 S. 8th St., St. Louis 4.
- Benjamin Elec. Mfg. Co., Des Plaines, Ill.
- Benson Co., Inc., Alex R., 1040 S. Bay Rd., Hudson, N. Y.
- Berger Bros. Co., 229-237 Arch St., Philadelphia 6.
- Berger Mfg. Div. of Republic Steel Corp., 1038 Belden Ave., N. E., Canton 5, O.
- Bergman Tool Mfg. Co., 1573-75 Niagara St., Buffalo 13, N. Y.
- Bergstrom Mfg. Corp., Neenah, Wis.
- Bern's Specialty Mfg. Co., 2278 Elston Ave., Chicago.
- Bernz Co., Otto, 280 Lyell Ave., Rochester, N. Y.
- Berridge Shear Company, Jefferson & St. Joseph Sts., Sturgis, Mich.
- Bersted Co., Martin, 341 N. Crawford Ave., Chicago.
- Bertram Mfg. Co., 230 E. Ohio St., Chicago.
- Bertsch & Co., Church St., Cambridge City, Ind.
- Best Register Co., 2005 W. Oklahoma Ave., Milwaukee 7.
- Bethlehem Foundry & Machine Co., Brodhead Ave. & Second St., Bethlehem, Pa.
- Bethlehem Steel Co., Bethlehem, Pa.
- Betz Corp., 460 State St., Hammond, Ind.
- Beverly Shear Co., 3009 W. 110th Pl., Chicago 43.
- Bieler & Son, L., 35-42 41st St., Long Island City, N. Y.
- Bien Air Conditioning Company, Bell, Calif.
- Biersach & Niedermeyer Co., 1937 N. Hubbard St., Milwaukee 12.
- Biggs Supply Co., B. C., Lincoln, Nebr.
- Binks Mfg. Co., 3114 Carroll Ave., Chicago 12.
- Bird Archer Co., 4337 N. America St., Philadelphia.
- Bird & Son, Inc., East Walpole, Mass.
- Bishop & Babcock Mfg. Co., 4901 Hamilton Ave., Cleveland 14.
- Black & Decker Mfg. Co., 782 Pennsylvania Ave., Towson 4, Md.
- Black Servant Stoker Co., 6504 Olive Blvd., St. Louis 5.
- Blake & Johnson Co., Waterville, Conn.
- Bliss Co., E. W., 1420 Hastings St., Toledo, O.
- Blockson & Co., E. Fifth St., Michigan City, Ind.
- Blood Brothers Machine Co., Div. Standard Steel Spring Co., Allegan, Mich.
- Blower Application Co., 918 N. 4th St., Milwaukee 3.
- Blue Ridge Talc Co., Inc., Henry, Va.
- Bodine Electric Co., 2254 W. Ohio St., Chicago 12.
- Bogue Electric Co., 37 Kentucky Ave., Paterson, N. J.
- Bohn Aluminum & Brass, Michigan Ave. & Shelby St., Detroit.
- Bollaert, M., 3936 Rhoda Ave., Oakland, Calif.
- Borm Manufacturing Co., Elgin, Ill.
- Bossert Co., Inc., 1002 Oswego St., Utica, N. Y.
- Boston Gear Wks., Inc., North Quincy, Mass.
- Botfield Refractories Co., Swanson & Clymer Sts., Philadelphia 47.
- Bovee Furnace Works, 180 W. Eighth St., Waterloo, Ia.

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Boyd & Co., Inc., Chas. P., 250-252 N. Third St., Philadelphia.
 Braden Mfg. Co., 431 N. 14th St., Terre Haute, Ind.
 Brasco Mfg. Co., 152nd & Commercial Ave., Harvey, Ill.
 • Brauer Supply Co., A. G., 2100 Washington Ave., St. Louis 3.
 Breidert, G. C., Co., 634 S. Spring St., Los Angeles 14.
 • Bremli Mfg. Co., Box 1030, Erie, Pa.
 • Breuer Electric Mfg. Co., 5100 N. Ravenswood Ave., Chicago 40.
 Bridesburg Foundry Co., Tacony & Duncan Sta., Philadelphia.
 Bridgeport Brass Co., 30 Grand St., Bridgeport 2, Conn.
 Bridgeport Chain & Mfg. Co., 964 Crescent Ave., Bridgeport 1, Conn.
 Bridgeport Screw Co., Bridgeport, Conn.
 Briggs Mfg. Co., 11631 Mack Ave., Detroit.
 Brigham Oil Burner Co., 2745 Forest Park Blvd., St. Louis.
 Bristol Co., P. O. Box 1790 Waterbury, 91, Conn.
 Brooklyn Metal Ceiling Co., 283-80 Greene Ave., Brooklyn, N. Y.
 Brooks Co., Inc., B. D., 361 Atlantic Ave., Boston 10.
 Bros Boiler & Mfg. Co., Wm., 1057 Tenth Ave., S. E., Minneapolis 14.
 Brown-Appton Co., 681 Fifth Ave., New York City.
 Brown-Brockmeyer Co., Inc., 1098 Smithville Rd., Dayton, O.
 Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., 4443 Wayne Ave., Philadelphia.
 • Brown Steel Tank Co., 2901 S. E. Fourth St., Minneapolis.
 Brownell Co., 300 N. Findlay St., Dayton 1, O.
 Brownie Stoker Co., 840 N. Morgan St., Decatur, Ill.
 Browning Mfg. Co., Inc., Central Ave., Main & Chester Sts., Maysville, Ky.
 Brumme Mfg. Co., Bloomington, Ill.
 • Brundage Co., 500 N. Park St., Kalamazoo 11, Mich.
 Brunner Mfg. Co., 1821 Broad St., Utica 1, N. Y.
 Bryan Steam Corp., P. O. Box 337, Peru, Ind.
 Bryant Corp., C. L., 4610 St. Clair Ave., Cleveland 3.
 • Bryant Heater Co., 17825 St. Clair Ave., Cleveland 10.
 Bubar, Hudson H., 15 Park Row, New York City 7.
 Buckeye Portable Tool Co., 25 W. Apple St., Dayton, O.
 Buckeye Products Co., 7024 Vine St., Cincinnati 16, O.
 Buffalo Forge Co., 497 Broadway, Buffalo, N. Y.
 Buffalo Pumps, Inc., 171 Mortimer St., Buffalo, N. Y.
 Buffalo Wire Works Co., 308-332 Terrace, Buffalo.
 Burdett Mfg. Co., 19 N. Sheldon St., Chicago.
 Burgess-Norton Mfg. Co., 773 Peyton St., Geneva, Ill.
 Burgess Soldering Furnace Co., 292 E. Long St., Columbus, O.
 Burke Electric Co., 1201 W. 12th St., Erie, Pa.
 Burke Stoker & Mfg. Co., 921 W. 19th St., Chicago.
 Burnham Stoker Co., 505 Columbia St., Vancouver, Wash.
 Burnley Battery & Mfg. Co., Clay St., North East, Pa.
 Burnside Steel Foundry Co., 1300 E. 92nd St., Chicago.
 Burnwell Corp., 1113 N. 20th St., Allentown, Pa.
 Burt Mfg. Co., 301 Main St., Akron 11, O.
 Bush Mfg. Co., 100 Wellington St., Hartford 6, Conn.
 Butler Street Fdry. & Iron Co., 3422 Normal Ave., Chicago.
 Byers Co., A. M., Clark Bldg., Pittsburgh 22.

C

C-B Tool Co., Wabank Road, Lancaster, Pa.
 C. & H. Air Conditioning Fan Co., Inc., Edgewood & Ivy Sts., N. E., Atlanta, Ga.
 Cabot, Inc., Samuel, 141 Milk St., Boston 9.
 Calbar Paint & Varnish Co., 2620 N. Martha St., Philadelphia, 25.
 Caldwell Co., Inc., W. E., 300 E. Brandeis, Louisville 8, Ky.
 California Wire Cloth Corp., 1001 22nd Ave., Oakland, Calif.
 Calkins & Pearce, 203-205 E. Long St., Columbus, O.
 Callahan Can Machine Co., Inc., 80 Richards St., Brooklyn.
 Caloroll Burner Corp., 1477 Park St., Hartford 6, Conn.
 Campbell, Andrew C., Division of American Chain & Cable Co., Inc., 929 Connecticut Ave., Bridgeport 2, Conn.
 Campbell Htg. Co., E. K., 2445 Charlotte St., Kansas City 8, Mo.
 Campbell Htg. Co., E. K., 2445 Charlotte St., Kansas City, Mo.
 Campbell Machine Co., 2845 Harriet Ave., Minneapolis.
 Canatsey Electric Mfg. Co., 620 Wyandotte, Kansas City, Mo.
 Canton Steel Ceiling Co., 194 Ninth Ave., New York City.
 Canton Stoker Corp., 507 Andrews Pl., S. W., Canton 1, O.
 Canvas Products Co., 1236 S. 7th St., St. Louis.
 Capps, Joseph, Inc., 3200 Ardmore St., South Gate, Calif.
 Carbide & Carbon Chemicals Corp., 30 E. 42nd St., New York City 17.
 Carey Co., Philip, Lockland 15, Cincinnati, O.
 Cargoaire Engineering Corp., 75 West St., New York, N. Y.
 Carlin Co., Anthony, 2717 E. 75th St., Cleveland.
 Carnegie-Illinois Steel Corp., Carnegie Bldg., Pittsburgh 30.
 Carney Rockwool Co., Mankato, Minn.
 Carpenter Heating & Stoker Co., 1929 E. 55th St., Cleveland.
 Carpenter & Paterson, Inc., 1190 Bennington St., East Boston, Mass.
 Carrier Corp., 302 S. Geddes St., Syracuse 1, N. Y.
 Carter Paint Co., 310 N. Main St., Liberty, Ind.
 Carter Products Corp., 6921 Carnegie Ave., Cleveland 3.
 Cartier & Sons Co., M. N., 275 Canal St., Providence, R. I.
 Carty & Moore Eng. Co., 511 W. Larned St., Detroit.
 Cary Mfg. Co., Waupaca, Wis.
 Catskill Metal Works, Inc., Catskill, N. Y.

Celotex Corp., 120 S. LaSalle St., Chicago 3.
 Central Die Casting & Mfg. Co., Inc., 2935 W. 47th St., Chicago.
 Central Furnace & Stove Repair Co., 3937 Olive St., St. Louis 8.
 Central Rubber & Steel Corporation, Findlay, Ohio.
 • Central-West Machinery Co., 335 S. Western Ave., Chicago 12.
 Centri-Spray Co., 14290 Meyers Rd., Detroit 27.
 • Century Electric Co., 1806 Pine St., St. Louis 3.
 • Century Engineering Corp., 401-431 Third St., S. E., Cedar Rapids, Ia.
 Century Fan & Vent. Co., 103 E. 125th St., New York City.
 Certain-teed Products Corp., 100 E. 42nd St., New York City.
 Certified Flexible Couplings, 369 Lexington Ave., New York City 17.
 Chace Co., W. M., 1606 Beard Ave., Detroit 9.
 Chain Belt Co., 1618 W. Bruce St., Milwaukee.
 Chalmers Oil Burner Co., 318 First Ave., N., Minneapolis.
 Chamberlin Metal Weather Strip Co., 1254 La Brousse, Detroit 26.
 Champion Blower & Forge Co., Harrisburg Ave. & Charlotte St., Lancaster, Pa.
 Champion Furnace Pipe Co., 211-215 Eaton St., Peoria 3, Ill.
 • Champion Tool Co., 376 W. 41st Pl., Los Angeles 37.
 Chandler Co., 804 1st Ave., N. W., Cedar Rapids, Ia.
 • Char-Gale Mfg. Co., 3127 Hiawatha Ave., Minneapolis 6.
 Chase Brass & Copper Co., Incorporated, 236 Grand St., Waterbury 91, Conn.
 Cheesman-Elliott Co., Inc., 639 Kent Ave., Brooklyn 11.
 Chelsea Fan & Blower Co., Inc., 1206 S. Grove St., Irvington 11, N. J.
 Chelsea Products, Inc., 1206 S. Grove St., Irvington 11, N. J.
 • Cheney Metal Products Co., 625 Prospect St., Trenton, 5, N. J.
 • Cherry Rivet Co., 231 Winston St., Los Angeles 13.
 Chicago Automatic Stoker Co., Inc., 14 N. Clinton St., Chicago 6.
 Chicago Belting Co., 113 N. Green St., Chicago 7.
 Chicago Die Casting Co., 2520 W. Monroe St., Chicago 12.
 Chicago Expansion Bolt Co., 2240 W. Ogden Ave., Chicago 12.
 Chicago Filter Co., P. O. Box 807, Joliet, Ill.
 Chicago Fire Brick Co., 1467 N. Elston Ave., Chicago.
 Chicago Furnace Supply Co., 1278 Clybourn Ave., Chicago 10.
 Chicago Metal Hose Corp., 1315 S. Third Ave., Maywood, Ill.
 Chicago Metal Mfg. Co., 3724 S. Rockwell St., Chicago 32.
 Chicago Perforating Co., 2445 W. 24th Pl., Chicago.
 Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
 • Chicago Precision Equipment Co., 919 N. Michigan Ave., Chicago 11.
 Chicago Pump Co., 2330 Wolfram St., Chicago 18.
 Chicago Rawhide Mfg. Co., 1312 Elston Ave., Chicago.
 Chicago Rivet & Mach. Co., 9600 W. Jackson Blvd., Bellwood, Ill.
 Chicago Steel Foundry Co., Kedzie & 37th St., Chicago.
 Chicago Steel Furnace Co., 7934 S. Chicago Ave., Chicago 17.
 • Chicago Steel Service Co., 3912 S. Ashland Ave., Chicago 9.
 Chicago Steel & Wire Co., 103rd & Torrence Ave., Chicago 17.
 Choate Mfg. Co., 3464 Principio Ave., Cincinnati.
 Cincinnati Elec. Tool Co., 2684 Madison Rd., Cincinnati 8.
 Cincinnati Shaper Co., Hopple, Garrard & Elam, Cincinnati.
 Cincinnati Sheet Metal & Roofing Co., 230 E. Front St., Cincinnati.
 Cincinnati Stamping Co., 28-34 W. McMicken Ave., Cincinnati.
 Circo Tool Company, 902 W. Villet St., Milwaukee 5, Wis.
 Circulators & Devices Mfg. Corp., 100 Prince St., New York City.
 • Clarage Fan Co., North & Porter Sts., Kalamazoo 16, Mich.
 Clark Bros. Bolt Co., Milldale, Conn.
 Clark Co., Henry N., 56-62 Union St., Boston 8.
 Clark Controller Co., 1146 E. 152 St., Cleveland 10.
 Clark Dust Control Co., 210 N. Mozart St., Chicago.
 Clark Jr., Electric Co., Jas., 600 E. Bergman St., Louisville 3, Ky.
 Clark Stek-O Corp., 1631 Dewey Ave., Rochester 13, N. Y.
 Clause Shear Co., Fremont, O.
 Clay Equipment Corp., Cedar Falls, Ia.
 Clayton & Lambert Mfg. Co., 14247 Tireman Ave., Dearborn, Mich.
 Clearing Machine Corp., 6499 W. 65th St., Chicago 38.
 Clendenin Brothers, Inc., 108 South St., Baltimore 2, Md.
 Clements Mfg. Co., 6650 S. Narragansett Ave., Chicago.
 Clemenson Bros., Inc., Middletown, N. Y.
 • Cleveland Humidifier Co., 7802 Wade Park Ave., Cleveland 3.
 Cleveland Punch & Shear Works Co., E. 40th & St. Clair Ave., Cleveland 14.
 Cleveland Pneumatic Tool Co., 3781 E. 77th St., Cleveland 5.
 • Cleveland Steel Products Corp., Torridsheet Div., Madison Ave. at W. 74th St., Cleveland 2.
 Clinton Metallic Paint Co., P. O. Box 278, Clinton, N. Y.
 Clizbe Bros. Mfg. Co., P. O. Box 31, Plymouth, Ind.
 Clough, A. W., 28 S. Broad St., Meriden, Conn.
 Coal-O-Matic Stoker Co., Truckville, Pa.
 Coast Insulating Corp., 634 S. Western Ave., Los Angeles.
 Coast Pneumatic Tool Co., 6516 Selma Ave., Los Angeles 28.
 Cocking, Geo. J., 1336 W. 5th St., Santa Ana, Calif.
 Coddington Mfg. Co., E. D., 5024 N. 37th St., Milwaukee.
 Colebrook & Sons, Inc., W. H., 246 Walton St., Syracuse, N. Y.
 Cole Hot Blast Mfg. Co., 3108 W. 51st St., Chicago 32.
 • Cole-Sullivan Engineering Co., 1316 3rd St., N., Minneapolis 11.
 • Coleman Lamp & Stove Co., 2nd & St. Francis, Wichita 1, Kan.
 Colonial Alloys Co., 2154 E. Somerset St., Philadelphia 34.
 Columbia Burner Co., 729 Ewing St., Toledo, O.
 Columbia Steel Co. (Sub. United States Steel Corp.), Russ Bldg., 235 Montgomery St., San Francisco 6.

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Columbus Heating & Ven. Co., 182 N. Yale Ave., Columbus 16, Ohio.
 Comfort Products Corp., 7 W. 147th St., Harvey, Ill.
 Commercial Plastics Co., 201 N. Wells St., Chicago 6.
 Commercial Shearing & Stamping Co., P. O. Box 719, Youngstown 1, Ohio.
 Commonwealth Products Co., 1303 Real Estate Tr. Bldg., Philadelphia 7.
 Compton Shear Co., W. H., 314 Camden, Newark 3, N. J.
 Conco Corporation, Mendota, Ill.
 Conco Engineering Wks., Div. H. D. Conkey & Co., Mendota, Ill.
 Condensation Engineering Corp., 122 S. Michigan Ave., Chicago 3.
 Conditionaire Unit Co., 2821 Montrose Ave., Chicago 18.
 Congress Die Casting Div., Congress Tool & Die Co., 3750 East Outer Drive, Detroit 12.
 Conklin Brass & Copper Co., Inc., T. E., 54-60 Lafayette St., New York City.
 Connery Construction Co., 3900 N. 2nd St., Philadelphia.
 Connor Eng. Corp., W. B., 114 E. 32nd St., New York City 16.
 Connors Paint Mfg. Co., Wm., 669-683 River St., Troy, N. Y.
 Consolidated Car-Heating Co., Inc., Albany, N. Y.
 Consolidated Industries, Inc., 14 N. Sixth St., Lafayette, Ind.
 Continental Diamond Fibre Co., Newark, Del.
 Continental Electric Co., Inc., 323 Ferry St., Newark 5, N. J.
 Continental Machines, Inc., 1301 Washington Ave., S., Minneapolis 4.
 Continental Products Co., 1150 E. 222nd St., Euclid 17, O.
 Continental Rubber Works, 1900 Liberty Pkwy., Erie, Pa.
 Continental Screw Co., Mt. Pleasant St., New Bedford, Mass.
 Continental Steel Corp., 1108 S. Main St., Kokomo, Ind.
 Controlair, Inc., 607 West Ave., Elyria, O.
 Cook, Inc., A. D., P. O. Box 70, Lawrenceburg, Ind.
 Cook Electric Co., 2700 Southport Ave., Chicago.
 Cooper Co., Clark, Palmyra, N. J.
 Cooper & Cooper, Inc., 37 Fenn St., Pittsfield, Mass.
 Cooper Oven Thermometer Co., Pequabuck, Conn.
 Copeland Refrigeration Corp., Sidney, O.
 Cooper Roofs Corp., 5060 Plankinton Bldg., Milwaukee.
 Copperweld Steel Co., Glassport, Pa.
 Coppus Engineering Corp., 344 Park Ave., Worcester 2, Mass.
 Corbin Screw Corp., 1944 High St., New Britain, Conn.
 Corbman Bros., Inc., 315 N. 7th St., Philadelphia.
 Cordo Chemical Corp., 34 Smith St., Norwalk, Conn.
 Cork Import Corp., 330 W. 42nd St., New York City 18.
 Cork Insulation Co., Inc., 155 E. 44th St., New York City.
 Cornell Iron Works, Inc., 36th Ave. & 13th St., Long Island City, N. Y.
 Coroaire Heater Corp., 1422 Euclid Ave., 1124 Hanna Bldg., Cleveland 15.
 Cotta Transmission Corp., 2340 Eleventh St., Rockford, Ill.
 Cox Roofing Co., 1014 North-West Blvd., Winston-Salem, N. C.
 Cramer Co., Inc., The R. W., Centerbrook, Conn.
 Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
 Crawford Co., 3220 W. 31st St., Chicago 23.
 Crary Mfg. Co., 396 N. Second St., Middleport, O.
 Crescent Tool Co., 230 Harrison St., Jamestown, N. Y.
 Crise Electric Mfg. Co., 2040 E. Main St., Columbus 16, O.
 Crocker-Wheeler Electric Mfg. Co., Ampere 1, N. J.
 Cross Engineering Co., 160-178 Dundaff St., Carbondale, Pa.
 Crowe Name Plate & Mfg. Co., 3701 Ravenswood Ave., Chicago.
 Crown Iron Works, 1229 Tyler St., N. E., Minneapolis 13.
 Crucible Steel Co. of America, 405 Lexington Ave., New York 17.
 Curtis Refrigerating Machine, Div. Curtis Mfg. Co., 1946 Klenlen Ave., St. Louis 20.
 Cutler-Hammer, Inc., N. 12th St. and W. St. Paul Ave., Milwaukee 1.
 Cyclone Fence Div., American Steel & Wire Co., Waukegan, Ill.

D

Dahlquist Mfg. Co., Inc., 628 Somerville Ave., Somerville 43, Mass.
 Dahlstrom Machine Works, 5014 N. Kedzie Ave., Chicago 25.
 Dahlstrom Metallic Door Co., S. E. Cor. E. Second & Buffalo Sts., Jamestown, N. Y.
 Dallas Engineering Co., Inc., 2000 S. Akard, Dallas, Tex.
 Dallman Supply Co., 6th & Q Sts., Sacramento 6, Calif.
 Dalzen Tool & Mfg. Co., 12255 E. Eight Mile Rd., Detroit.
 Damascus Steel Products Corp., 2215 Kishwaukee St., Rockford, Ill.
 Dampney Co. of America, 1243 River St., Hyde Park, Boston.
 Daniels Mfg. Co., Inc., Sam, Daniels Rd., Hardwick, Vt.
 Danville Stove & Mfg. Co., Beaver St., Danville, Pa.
 Danzer Metal Works Co., Box 201, Hagerstown, Md.
 Davidson Hy Duty Roof Fan Co., Newton, Mass.
 Davis & Co., Inc., Dean W., 549 W. Fulton St., Chicago 6.
 Davis Regulator Co., 2546 S. Washtenaw Ave., Chicago 8.
 Davison Chemical Corp., Baltimore 3, Md.
 Davy Fuel & Supply Co., Stoker Div., 14460 Dexter Blvd., Detroit.
 Day Co., 810 Third Ave., N. E., Minneapolis 13.
 Day & Night Manufacturing Co., Monrovia, Calif.
 Dayton Greenhouse Mfg. Co., P. O. Box 801, Dayton, O.

Dayton Pump & Mfg. Co., 500 N. Webster St., Dayton, O.
 Dayton Rogers Mfg. Co., 2830 13th Ave., S., Minneapolis.
 Dayton Rubber Mfg. Co., 2345 W. Riverview Ave., Dayton 1, O.
 Debevoise Co., 968 Grand St., Brooklyn 6.
 De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
 Decatur Iron & Steel Co., P. O. Box 72, Decatur, Ala.
 Decatur Pump Co., 2750 Nelson Park Rd., Decatur, Ill.
 Defender Instrument and Regulator Co., 303 S. 8th St., St. Louis 2.
 De Laval Steam Turbine Co., 300 Nottingham Way, Trenton, N. J.
 Delco Appliance Div., General Motors Corp., 391 Lyell Ave., Rochester 1, N. Y.
 Delco Products Division, General Motors Corp., 329 E. First St., Dayton, O.
 D'Elia Oil Burner Co., Inc., 145 Stratford Ave., Bridgeport 3, Conn.
 Deming Co., 148 Aetna St., Salem, O.
 Demuth & Sons, Charles, 245 Elm Place, Mineola, L. I., N. Y.
 Deniston Co., 4856 S. Western Ave., Chicago 9.
 Densewood Corporation, Elkhorn, Wis.
 Denmore-Quinlan Co., 910 74th St., Kenosha, Wis.
 Deshler Foundry & Machine Wks., 140 S. East Ave., Deshler, O.
 Des Moines Stove Repair Co., 107 S. W. Second Ave., Des Moines 5, Ia.
 Despatch Oven Co., 619 Southeast St., Minneapolis 14.
 Detroit Air Conditioning Service Co., Inc., 1314 Holden Ave., Detroit.
 Detroit Gasket & Mfg. Co., 12840 Burt Rd., Detroit.
 Detroit Graphite Co., 550 Twelfth St., Detroit.
 Detroit Lubricator Co., 5900 Trumbull Ave., Detroit 8.
 Detroit-Michigan Stove Co., 6900 E. Jefferson Ave., Detroit.
 Detroit Moulding Div., L. A. Young Spring & Wire Corporation, 9210 Russell St., Detroit 11.
 Detroit Safety Furnace Pipe Co., 5960 Second Blvd., Detroit.
 Detroit Stamping Co., 350 Midland Ave., Detroit 3.
 Detroit Steel Products Co., 2250 E. Grand Blvd., Detroit.
 Detroit Stoker Co., General Motors Bldg., Detroit 2. (Sales & Engineering); Monroe, Mich. (Main Office & Works).
 Detroit Surfacing Machine Co., 7433 W. Davison St., Detroit.
 Detroit Torch & Mfg. Co., 12057 Cardoni Ave., Detroit.
 De Vilbiss Co., 300 Phillips Ave., Toledo 1, O.
 Devoe & Reynolds Co., Inc., 44th St. & 1st Ave., New York City 17.
 Diamond Castings Co., Terra Cotta Rd., Johnsonburg, Pa.
 Diamond Chain & Mfg. Co., 400 Kentucky Ave., Indianapolis 7.
 Diamond Expansion Bolt Co., Inc., 500 North Ave., Garwood, N. J.
 Diamond Manufacturing Co., 243 W. 8th St., Wyoming, Pa.
 Diceler Corp., Gasport, N. Y.
 Dick Co., Inc., R. & J., 24-48 Sade St., Passaic, N. J.
 Dickey-Grabler Co., 10298 Madison Ave., Cleveland.
 Dickson Co., 7420 Woodlawn Ave., Chicago.
 Dickson Coal Co., 30 Rockefeller Plaza, New York City.
 Dickson Weatherproof Nail Co., P. O. Box 590, Evanston, Ill.
 Dieckmann Co., Ferdinand, 1180 Harrison St., Cincinnati, O.
 Diehl Mfg. Co., Finderne Plant, Somerville, N. J.
 Diener Mfg. Co., Geo. W., 400 N. Monticello Ave., Chicago.
 Diston & Sons, Inc., Henry, Unruh & Milner Sts., Tacony Sta., Philadelphia 35.
 Doall Co., a Div. Wilkie Enterprises, 1201 Thacker St., Des Plaines, Ill.
 Dockson Corp., 3847 Wabash Ave., Detroit 8.
 Dodge Mfg. Co., 500 S. Union St., Mishawaka, Ind.
 Doheny Co., John J., 326 Lake St., Belmont, Mass.
 Dollinger Corp., 11 Centre Park, Rochester 4, N. Y.
 Dornback Furnace & Fdry. Co., 724 E. 103rd St., Cleveland.
 Dow Chemical Co., Midland, Mich.
 Dowagiac Steel Furnace Co., Beeson St., Dowagiac, Mich.
 Downs-Smith Brass & Copper Co., 304-320 E. 45th St., New York City 17.
 Doyle Vacuum Cleaner Co., 225 Stevens St., S. W., Grand Rapids 7, Mich.
 Dracco Corp., 4057 E. 116th St., Cleveland, O.
 Dragert Co., C. H., Inc., 237 India St., Brooklyn.
 Dravo Corp., Neville Island, Pittsburgh 25.
 Drayer-Hanson, Inc., 738 E. Pico Blvd., Los Angeles 21.
 Dreis & Krump Mfg. Co., 7404 Loomis Blvd., Chicago 36.
 Drying Systems, Inc., 1800 W. Foster Ave., Chicago 40.
 Dry-Zero Corp., 222 W. North Bank Drive, Chicago 54.
 Dual-Air Fan Corp., 711 W. Lake St., Chicago.
 Dual Remote Control Co., Wayne, Mich.
 Dunham Co., C. A., 450 E. Ohio St., Chicago, Ill.
 Dunn, Inc., Struthers, 1321 Arch St., Philadelphia 7.
 Duo-Therm Div., Motor Wheel Corp., Lansing 3, Mich.
 du Pont de Nemours & Co., E. I., Wilmington 98, Del.
 Durakool, Inc., 1010 N. Main St., Elkhart, Ind.
 Duraloy Co., Scottsdale, Pa.
 Duriron Co., Inc., 450 N. Findlay St., Dayton 1, O.
 Duro Metal Products Co., 2649 N. Kildare Ave., Chicago.
 Dusing & Hunt, Inc., 1927 Elmwood Ave., Buffalo 7, N. Y.
 Dutton Asbestos & Supply Co., 532 Natoma St., San Francisco.
 Dwyer Mfg. Co., F. W., 565 W. Washington St., Chicago 6.
 Dyer Welder & Engineering Co., 7 E. 19th St., Kansas City 8, Mo.
 Dynamic Air Engineering, Inc., 843 San Julian St., Los Angeles 14.

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E

Eagle-Picher Lead Co., American Bldg., Central Pkwy. & Walnut, Cincinnati 1.
 Eaglesfield Ventilator Co., 910-20 Dorman St., Indianapolis.
 Earl Co., Warren, 3409 McKinney Ave., Houston, Tex.
 East Anaheim Sheet Metal Works, 2299 E. Anaheim Blvd., Long Beach, Calif.
 Eastern Air Devices, Inc., 585 Dean St., Brooklyn 17.
 Eastern Oil & Equipment Co., 27 Portland St., Portland, Me.
 Eastern Stainless Steel Corporation, P. O. Box 1975, Baltimore 3, Md.
 Eastern States Supply Co., 127 Troutman St., Brooklyn 6.
 Eav-Tex Co., 307 Lincoln Ave., Upper Darby, Pa.
 Eclipse Air Brush Co., Inc., 381 Park Ave., Newark, N. J.
 Eclipse Aviation Div., Bendix Aviation Corp., Bendix, N. J.
 Eclipse Fuel Engineering Co., 707 S. Main St., Rockford, Ill.
 Economy Electric Mfg. Co., 4634 W. 21st Pl., Cicero 50, Ill.
 Economy Pumps, Inc., 1000 Weller Ave., Hamilton, O.
 Eddy Stoker Corp., 4717 W. North Ave., Chicago 39.
 Edison, Inc., Thomas A., Instrument Div., Lakeside Ave., West Orange, N. J.
 Edwards Furnace Co., 25 East Ave., Wellsboro, Pa.
 Edwards Mfg. Co., Inc., 337 Eggleston Ave., Cincinnati, O.
 Effecto Grille Co., 9930 Freeland, Detroit 27.
 Ehret Magnesia Mfg. Co., Valley Forge, Pa.
 Elermann Floor Scraper Co., 102 E. Market St. (rear), York, Pa.
 Elker Mfg. Co., Ogallala, Nebr.
 Elmer & Amend, 635 Greenwich St., New York 14.
 Elser Engineering Co., 761 S. 13th St., Newark 3, N. J.
 • Elaterite Plastic Products, 205 Sixth St., Canton 2, O.
 Elco Tool & Screw Corp., 1800 Broadway, Rockford, Ill.
 Electric Arc, Inc., 152 Jelliff Ave., Newark 8, N. J.
 Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland.
 Electric Furnace Man, Inc., 4th & Furnace Sts., Emmaus, Pa.
 Electric Machinery Mfg. Co., 1137 Tyler St., N. E. Minneapolis 13.
 Electric Materials Co., Clay & Washington Sts., North East, Pa.
 Electric Soldering Iron Co., Inc., W. Elm St., Deep River, Conn.
 Electric Sprayt Co., 1415 Illinois Ave., Sheboygan, Wis.
 Electric Vacuum Cleaner Co., Inc., 1734 Ivanhoe Rd., Cleveland 10.
 Electric Valve Mfg. Co., Inc., 68 Murray St., New York City 7.
 Electromatic Div., The Simoniz Co., 2100 Indiana Ave., Chicago 16.
 Electroair Corp., 1455 W. Congress St., Chicago 7.
 Electrol Manufacturing Co., 253 Chestnut St., Passaic, N. J.
 Electronic Products Co., Geneva, Ill.
 Electrovent Corp., 5245 Western Ave., Detroit, Mich.
 Electrovent Fan & Mfg. Co., 812 W. Lake St., Chicago.
 • Elgo Shutter & Mfg. Co., 6970 W. Jefferson Ave., Detroit 17.
 Ellison Draft Gage Co., 214 W. Kinzie St., Chicago 10.
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 Emerson Electric Mfg. Co., 1843 Washington Ave., St. Louis 3.
 Empire Door Co., Inc., 226 E. 144th St., New York City.
 Empire Metal Co., 820 E. Water St., Syracuse, N. Y.
 Empire Sheet & Tin Plate Co., N. Bowman St., Mansfield, O.
 Empire Ventilation Equipment Co., 35-39 Vernon Blvd., Long Island City, N. Y.
 Engelhard, Inc., Chas., 90 Chestnut St., Newark, N. J.
 Enterprise Foundry, Inc., 1123 E. "B" St., Belleville, Ill.
 Equipment Engineering Co., 2853 Columbus Ave., Minneapolis.
 Erdle Perforating Co., 171 York St., Rochester 11, N. Y.
 Ergolyte Mfg. Co., 3627 N. Lawrence St., Philadelphia 40.
 Eselsgroth & Co., 22 Edison Pl., Newark 2, N. J.
 Ess Instrument Co., Fort Lee, N. J.
 Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21.
 Estate Stove Co., Hamilton, O.
 Etched Products Co., 3901 Queens Blvd., Long Island City.
 Eugene Excelsior Co., Eugene, Ore.
 Eutectic Welding Alloys Co., 40 Worth St., New York City 13.
 Evanoff Div., Evans Products Co., 15310 Fullerton Ave., Detroit.
 Evans Corp., George, 121 37th St., Moline, Ill.
 • Evans Machine Co., L. R., 103 S. Main St., Sandwich, Ill.
 Evercrete Corp., 19 W. 44th St., New York City.
 Everhot Mfg. Co., 57 S. 19th Ave., Maywood, Ill.
 Everite Pump & Mfg. Co., Inc., 617 N. Price St., Lancaster, Pa.
 • Excel Heating & Air Conditioning Co., 3715 Belmont Ave., Chicago 18.
 Excelsior Steel Furnace Co., 118 S. Clinton St., Chicago 6.
 Excelsior Stove & Mfg. Co., 510 S. Front St., Quincy, Ill.
 Excelsior Tool & Machine Co., 31st & Ridge Ave., East St. Louis, Ill.
 Extended Surface, Inc., 58 Second Ave., Brooklyn, N. Y.
 Extruded Plastics, Inc., New Canaan Ave., Norwalk, Conn.

F

Fafnir Bearing Co., 37 Booth St., New Britain, Conn.
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 Fairfield Oil Heating Co., Inc., Mason St., Greenwich, Conn.
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 Falstrom Co., Main Ave. & D. L. & W. R. R. Passaic, N. J.
 • Falmec Machine Company, 175 S. Holborn, Racine, Wis.
 Fargo Foundry Co., 92 N. P. Ave., Fargo, N. D.

Farquhar Furnace Co., 150 Owens Ave., Wilmington, O.
 Farr Co., 2615 Southwest Dr., Los Angeles 43.
 Farrell-Cheek Steel Co., Stoker Parts Div., First & Lane Sts., Sandusky, O.
 Farelloy Co., Inc., 1243 N. 26th St., Philadelphia.
 Farris Furnace Co., 920-930 Enos Ave., Springfield, Ill.
 Faultless Heater Corp., 10217 St. Clair Ave., Cleveland.
 Favorite Stove Co., 440 Webster St., Piqua, O.
 Fedders Mfg. Co., Inc., 57 Tonawanda St., Buffalo 7.
 Federal Machine & Welder Co., 212 Dana St., Warren, O.
 Federal-Mogul Corp., 11031 Shoemaker St., Detroit 13.
 Fee & Mason Mfg. Co., 81 Beekman St., New York City.
 Fee & Stemwedel, Inc., 2210 Wabansia Ave., Chicago 47.
 Felters Co., Inc., 210 South St., Boston 11.
 Fern, Ralph, 2517 Boulevard Ave., Scranton 9, Pa.
 Ferro Enamel Corp., Liquid Plastics Div., 4150 E. 56th St., Cleveland 5.
 • Field Control Div., H. D. Conkey & Co., Drawer 111, Mendota, Ill.
 Figge Mfg. Co., 189 W. Madison St., Chicago 12.
 Fingles Co., The, Reisterstown Rd. at Elgin Ave., Baltimore.
 • Fireline Stove & Furnace Lining Co., 1816 Kingsbury St., Chicago 14.
 Firewood Machine Wks., Converse, Ind.
 Firestone Tire & Rubber Co., Firestone Park, Akron, O.
 Fir-Tex Insulating Board Co., St. Helens, Ore.
 Fisher Governor Co., 203 S. First Ave., Marshalltown, Ia.
 Fitzgibbons Boiler Co., Inc., 101 Park Ave., New York City 17.
 Fiemm Lead Co., Inc., Bradley Ave. & School St., Long Island City 1, N. Y.
 Flintkote Co., 30 Rockefeller Plaza, New York 20.
 Flood Co., 6217 Carnegie Ave., Cleveland.
 Floral City Co., 402 S. Monroe St., Monroe, Mich.
 Florence Stove Co., 205 School St., Gardner, Mass.
 Floridin Co., Warren, Pa.
 Floyd-Wells Co., Royersford, Pa.
 Flynn & Emrich Co., 301 Holliday St., Baltimore 2.
 • Follansbee Steel Corp., Third & Liberty Aves., Pittsburgh 30.
 Folsom Snow Guard Co., 336 Union St., Millis, Mass.
 Foote Foundry Co., J. B., N. Main St., Fredericktown, O.
 Ford Roofing Products Co., 111 W. Washington St., Chicago.
 • Forest City Foundries Co., 2500 W. 27th St., Cleveland 13.
 Forman Air Conditioning & Engineering Co., 345 W. 40th St., New York 18.
 Fossum Mfg. Co., M. H., 1795 St. Clair Ave., St. Paul.
 Fox Control & Mfg. Co., 3589 E. 93rd St., Cleveland.
 Foxboro Co., 38 Neponset Ave., Foxboro, Mass.
 Foy Stoker Mfg. Co., 1419 Diversey, Chicago.
 Franklin Gas Heating Co., Box 73, Station A, Cincinnati 23.
 • Fraser & Johnston Co., 735 Potrero Ave., San Francisco 10.
 • Frederick Iron & Steel Co., E. 7th & East Sts., Frederick, Md.
 Freed Heater & Stoker Co., Collegeville, Pa.
 Freed Products Co., 1510 Third Ave., Moline, Ill.
 Fresh'nd-Aire Co., 325 N. Wells St., Chicago 10.
 • Frey & Co., Frank P., 2634 W. Madison St., Chicago.
 Frick Co., W. Main St., Waynesboro, Pa.
 Friedley-Voshart Co., 763 W. Lexington St., Chicago.
 Friez Instrument Div., Bendix Aviation Corp., Taylor Ave. & Loch Raven Blvd., Towson, Baltimore 4.
 Frigidaire Div., General Motors Corp., 300 Taylor St., Dayton 1, O.
 • Front Rank Furnace Co., Div. Liberty Foundry Co., 2500 Ohio Ave., St. Louis 4.
 Fuel Savers, Inc., 15th & Herr St., Harrisburg, Pa.
 Fuller-Warren Co., 2506 N. 32nd St., Milwaukee.
 Fulton Siphon Co., Box 400, Knoxville 4, Tenn.
 Furbio Co., Hermansville, Mich.

G

G. & O. Mfg. Co., 138 Winchester Ave., New Haven, Conn.
 G. & S. Tool Co., 8790 Grinnell, Detroit.
 G. D. S. Machinery & Supply Co., 101 Walker St., New York City.
 G. M. Manufacturing Co., 50 W. Third St., New York City 12.
 • Gallaher Co., Box 7, Owatonna, Minn.
 Galva Heater Co., Galva, Ill.
 Galv-Weld Products, 324 E. 2nd St., Dayton 10, O.
 Gammeter Co., W. F., Lincoln Ave., Extension, Cadiz, O.
 Gar Wood Industries, Inc., 7924 Ropelle St., Detroit 11.
 Garber Lumber & Construction Co., Strasburg, O.
 Garden City Fan Co., 332 S. Michigan Blvd., Chicago 4.
 Garden City Laboratory, Inc., 2744 W. 37th Pl., Chicago.
 Gardiner Metal Co., 2514 W. 48th Pl., Chicago 32.
 Gascol Furnace Co., The, 3126 Preble Ave., Pittsburgh.
 Gasoroll Mfg. Corp., Genoa City, Wis.
 Gates Rubber Co. Sales Div., Inc., 999 S. Broadway, Denver 17, Colo.
 Gaul Air Conditioner Co., 3116 N. Main St., Dayton 5, O.
 • Gehl Bros. Mfg. Co., West Bend, Wis.
 Gehri Co., 1117 Tacoma Ave., Tacoma, Wash.
 General Air Conditioning Corp., 4411 Appleton St., Cincinnati.
 • General Blower Co., 400 N. Peoria St., Chicago 22.
 General Blower Co., Inc., 5335 Market St., Philadelphia 39.
 • General Controls Co., 801 Allen Ave., Glendale 1, Calif.
 General Electric Co., Air Cond. and Com. Refr. Divs., 5 Lawrence St., Bloomfield, N. J.

• Advertisement in this issue. See Index to Advertisers, page 324.

General Electric Co., Plastics Div., 1 Plastics Ave., Pittsfield, Mass.

General Electric Co., 1 River Rd., Schenectady 5, N. Y.

General Equipment Co., 311-15-19 S. Wichita St., Wichita, Kan.

General Etching & Mfg. Co., 3076 W. Grand Ave., Chicago.

General Gas Light Co., 212 N. Park St., Kalamazoo 11F, Mich.

General Heating Products Co., 3353 University Ave., Minneapolis.

General Insulating Products Co., 8821 15th Ave., Brooklyn.

General Machine Co., Inc., Fourth & Furnace Sts., Emmaus, Pa.

General Machinery Co., 3500 Riverside Ave., Spokane, Wash.

General Metal Products Co., 3883 Delor St., St. Louis 16.

General Motors Corp., Moraine Products Div., Dayton, O.

General Oil Heating Corp., 528 Jefferson St., West New York, N. J.

General Plate Div., Metals & Controls Corp., 34 Forest St., Attleboro, Mass.

General Refrigeration Div., Yates-American Machine Co., Shirland Ave., Beloit, Wis.

General Sales & Products Co., 242 Saratoga St., Cohoes, N. Y.

General Scientific Equipment Co., 1346 W. Somerset St., Philadelphia 32.

General Sheet Metal Works, Inc., Stillman Ave. & Ash St., Bridgeport, Conn.

General Wesco Stove Co., 621 N. Jefferson Ave., Springfield, Mo.

Gerard Chemical Co., 87 Front St., Elizabeth, N. J.

Gerrett Corp., M. A., 722 W. Winnebago St., Milwaukee 5.

Gerhardt, W. F., 2007 W. Broad St., Richmond, Va.

Gerrock Bros. Mfg. Co., 1300 S. Vandeventer Ave., St. Louis.

Gerstein & Cooper Co., 1 W. Third St., South Boston 27, Mass.

Geuder, Paeschke & Frey Co., W. St. Paul Ave., and N. 15th St., Milwaukee.

Giant Mfg. Co., South Ave., Council Bluffs, Ia.

Gibraltar Engineering Co., 911 N. Orange Dr., Los Angeles.

Gilbert & Barker Mfg. Co., West Springfield, Mass.

Gilbert & Son, Harry E., 220 Brooklawn Terrace, Bridgeport, Conn.

Gillen Co., J. L., Dowagiac, Mich.

Gillian Mfg. Co., 7752 Dubois St., Detroit 11.

Gilmer Co., L. H., Cottman & Keystone Sts., Tacony, Philadelphia 35.

Gisholt Machine Co., 1253 E. Washington Ave., Madison 3, Wis.

Glasby Mfg. Co., Inc., J. P., Locust Ave. & Nelson St., Bloomfield, N. J.

Glaser Lead Co., Inc., 31 Wyckoff Ave., Brooklyn, N. Y.

Gleason-Avery, Inc., Auburn, N. Y.

Glidden Co., 11001 Madison Ave., Cleveland 2.

Globe Iron Roofing & Corrugating Co., Newport, Ky.

Globe Machine & Stamping Co., 1250 W. 76th St., Cleveland.

Globe Machinery & Supply Co., E. 1st & Court Ave., Des Moines, Ia.

Globe Roofing Products Co., Inc., 2207 Schrage Ave., Whiting, Ind.

Goese Mfg. Co., 2548 N. 18th St., Milwaukee 6.

Goethel Sheet Metal Works, Alfred, 1912 N. Killian Pl., Milwaukee.

Goettl Bros., 714 S. Central Ave., Phoenix, Ariz.

Golden-Anderson Valve Specialty Co., Fulton Bldg., Pittsburgh.

Goldens Foundry & Machine Co., P. O. Box 96, Columbus, Ga.

Gold Star Oil Burner Mfg. Co., 145 Warburton Ave., Yonkers, N. Y.

Goodrich Co., B. F., 500 S. Main St., Akron, O.

Goodyear Tire & Rubber Co., 1144 E. Market St., Akron, O.

Goulds Pumps, Inc., Fall St., Seneca Falls, N. Y.

Governair Corp., 617 N. W. Second St., P. O. Box 1654, Oklahoma City, Okla.

Grabler Manufacturing Co., 6565 Broadway, Cleveland.

Grammes & Sons, Inc., L. F., 388 Union St., Allentown, Pa.

Grand Rapids Blow Pipe & Dust Arrester Co., 526 Monroe Ave., Grand Rapids 2, Mich.

Grand Rapids Die & Tool Co., Div. Expert Die & Stamping Co., 329 Scribner Ave., Grand Rapids 2, Mich.

Grand Rapids Wire Products Co., 503 Front Ave., N. W., Grand Rapids 4, Mich.

Granite City Steel Co., 20th & Madison Ave., Granite City, Ill.

Grant Wilson, Inc., 141 W. Jackson Blvd., Chicago 4.

Graton & Knight Company, 356 Franklin St., Worcester 4, Mass.

Gray, G. L., 509 Grand Ave., New Haven 3, Conn.

Gray Metal Products, Inc., 30 Carleton St., Rochester, N. Y.

Great Lakes Steel Corporation, Ecorse, Detroit.

Great National Air Conditioning Corp., 2125 N. Harwood St., Dallas 1, Tex.

Green Colonial Furnace Company, 322 S. W. Third St., Des Moines 7, Ia.

Green Fire Brick Co., A. P., Mexico, Mo.

Green Mfg. Co., 605 W. Washington St., Chicago.

Greene, Tweed & Co., 4377 Bronx Blvd., Bronx, N. Y.

Greenlee Tool Co., 2136 Twelfth St., Rockford, Ill.

Grinnell Co., Inc., 260 W. Exchange, Providence 1, R. I.

Griscom-Russell Co., The, 285 Madison Ave., New York City.

Griswold Mfg. Co., 1001-1065 W. 12th St., Erie, Pa.

Grob Brothers, Grafton, Wis.

Grobet File Corp. of America, 421 Canal St., New York City.

Grossenbacher Furnace Co., 9416 W. Milton Ave., St. Louis.

Guardian Electric Mfg. Co., 1400 Washington Blvd., Chicago 7.

Guardian Utilities Co., 215 E. Michigan St., Michigan City, Ind.

Guth Co., Edwin F., 2615 Washington Blvd., St. Louis 3.

H

H-B Instrument Co., Inc., 2518 N. Broad St., Philadelphia 32.

H P L Mfg. Co., 2015 E. 65th St., Cleveland.

Hague & Co., Inc., Alfred, 227 34th St., Brooklyn, N. Y.

Haines Gauge Company, Inc., 2301 W. Allegheny Ave., Philadelphia. (Thickness Gauges)

Hall-Neal Furnace Co., 1324 N. Capitol Ave., Indianapolis 7.

Hallstead Iron Foundry, Hallstead, Pa.

Hammel Radiator Engineering Co., 3348 Motor Ave., Los Angeles 34.

Hammett Electric Mfg. Co., 2558 McGee Trafficway, Kansas City 8, Mo.

Hammond Machinery Builders, 1626 Douglas Ave., Kalamazoo, Mich.

Hampton Electric Mfg. Co., Third & Archie Sts., Oakmont, Pittsburgh.

Handelan Washed Air Co., 4006 Washburn Ave. South, Minneapolis.

Handley Brown Heater Co., 209 E. Washington Ave., Jackson, Mich.

Handy & Harman, 82 Fulton St., New York City 7.

Hansen Mfg. Co., Inc., Princeton, Ind.

Hardinge Oil Burner & Mfg. Co., 1770 Berteau Ave., at Ravenswood, Chicago 13.

Hare Engineering Co., 155 W. Congress St., Detroit 36.

Harnischfeger Corp., 4400 W. National Ave., Milwaukee.

Harrington & King Perforating Co., 5649 Fillmore St., Chicago 44.

Harris, A. R., 4546 Hohman Ave., Hammond, Ind.

Harris Calorific Co., 5501 Cass Ave., N. W., Cleveland.

Hart & Cooley Mfg. Co., 500 E. Eighth St., Holland, Mich.

Hart & Crouse Corporation, 301 Turner St., Utica, N. Y.

Hart Mfg. Co., Bartholomew & Hamilton Sts., Hartford, Conn.

Hart Mfg. Co., 2006 N. Western Parkway, Louisville 3, Ky.

Hart Oil Burner Div., Avery Farm Machinery Company, 2006 S. Washington St., Peoria 2, Ill.

Hartzell Propeller Fan Co., 1025 Roosevelt Ave., Piqua, O.

Harvey, Inc., Sld, 108 E. Mineola Ave., Valley Stream, N. Y.

Harvey-Whipple, Inc., 55 Emery St., Springfield 1, Mass.

Haskins Co., R. G., 615 S. California Ave., Chicago 12.

Hassall, Inc., John, Clay & Oakland Sts., Brooklyn 22.

Hastings Air Conditioning Company, Inc., Box 474, 108 S. Colorado Ave., Hastings, Nebr.

Hauk Manufacturing Co., 124-136 Tenth St., Brooklyn 15.

Hauserman Co., E. F., 6800 Grant Ave., Cleveland.

Hays Corp., 782 E. Eighth St., Michigan City, Ind.

Hays Mfg. Co., 801 W. 12th St., Erie, Pa.

Healy Ruff Co., 765 Hampton Ave., St. Paul 4, Minn.

Heartley Machine & Tool Co., 900-8 Summit St., Toledo, O.

Heath & Milligan Mfg. Co., Div. of The Glidden Co., 1833 S. Normal Ave., Chicago.

Heating Assurance, E. 124 Augusta, Spokane, Wash.

Heating Equipment Co., 600 Indiana St., San Francisco 7.

Heatlox Furnaces, Inc., 4320 S. Tacoma Way, Tacoma, Wash.

Heatseal Burner Co., 2501 Leavenworth St., Omaha, Nebr.

Hegeler Zinc Co., P. O. Box 599, Danville, Ill.

Hell Co., 3000 W. Montana St., Milwaukee.

Hemp & Company, Inc., Macomb, Ill.

Hendley & Whittemore Co., 6 Blackhawk Blvd., Beloit, Wis.

Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.

Henry & Wright Mfg. Co., 760 Windsor St., Hartford 1, Conn.

Henry Furnace Co., Medina, Ohio.

Herbert & Sons, T. L., 6th & Harrison St., Nashville, Tenn.

Herbusch Corporation, The, Simplex Control Div., 706 Chestnut St., St. Louis 1.

Hercro Oil Burner Corp., 109 W. Chestnut St., Lancaster, Pa.

Hercules Chemical Co., Inc., 332 Canal St., New York City.

Hercules Electric & Mfg. Co., Inc., 2416 Atlantic Ave., Brooklyn 33, N. Y.

Herd Utilities, Inc., 303 Canal St., Providence 3, R. I.

Heremetal Co., 202 Washington Ave., N., Minneapolis.

Heritage Coal & Stoker Co., 105 E. 63rd St., Chicago 37.

Herrmann & Grace Co., 671 Bergen St., Brooklyn, N. Y.

Herron-Zimmers Molding Co., 3900 E. Outer Drive, Detroit.

Hershey Machine & Foundry Co., Manheim, Pa.

Hess-Snyder Co., Massillon, Ohio.

Hess Warming & Ventilating Co., 1221-1227 S. Western Ave., Chicago.

Hetzel Roofing Products Co., 67 Main St., Newark.

Hexacon Electric Company, 161 W. Clay, Roselle Park, N. J.

Hill, E. Vernon, 6826 W. Highland Ave., Chicago.

Hillwood Manufacturing Co., 21600 St. Clair Ave., Cleveland 17.

Hilo Varnish Corp., 42-60 Stewart Ave., Brooklyn, N. Y.

Hinde & Dausch Paper Co., P. O. Box 861, Sandusky, O.

Hipoint Corp., Water, Elm & Arnold Sts., Bellefontaine, O.

Hirschman Co., Inc., W. F., 1245 McKinley Pkwy., Buffalo.

Hobart Brothers Co., Canal Lock Square, Troy, O.

Hodell Chain Co., 3924 Cooper Ave., Cleveland.

Hodgman Rubber Co., Framingham, Mass.

Holcomb & Hoke Mfg. Co., 1545 Van Buren St., Indianapolis.

Hollup Corp., Div. National Cylinder Gas Co., 3357 W. 47th Place, Chicago.

Holly Heating & Mfg. Co., 1000 Fair Oaks Ave., South Pasadena, Calif.

Holtum Mfg. Co., Freeport, Ill.

Holtzer-Cabot Electric Co., Div. First Industrial Corporation, 125 Amory St., Boston.

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- Home Furnace Co., 6th St. & P. M. R. R., Holland, Mich.
- Home Stove Co., 501 Kentucky Ave., Indianapolis.
- Homer Furnace & Foundry Corporation, Coldwater, Mich.
- Hones, Inc., Charles A., 122 S. Grand Ave., Baldwin, N. Y.
- Hood Co., B. Mifflin, Daisy, Tenn.
- Horn Co., A. C., 42-36 Tenth St., Long Island City, N. Y.
- Horton Mfg. Co., 3008 University Ave., S. E., Minneapolis.
- Hossfeld Mfg. Co., 460 W. Third St., Winona, Minn.
- Hotentot Co., Inc., 2423 Farnam St., Omaha, Nebr.
- Hotstream Heater Co., 2363 E. 69th St., Cleveland 4.
- Howe and Bassett Co., Inc., 840 University Ave., Rochester, N. Y.
- Howe Ice Machine Co., 2825 Montrose Ave., Chicago 18.
- Howell Electric Motors Co., Howell, Mich.
- Hewes-Woods Co., 210 Bridge St., Cambridge 41, Mass.
- Hub Specialty Co., 122 Orchard St., W. Somerville 44, Mass.
- Hubbard Co., 1014 Marquette Ave., Minneapolis.
- Hubbell Corp., 319 N. Albany Ave., Chicago.
- Hueller Mfg. Co., Inc., H. J., 559 Rogers Ave., Brooklyn, N. Y.
- Hunt & Son, C. B., Box 300, Salem, Ohio.
- Hunter Fan & Ventilating Co., 400 S. Front St., Memphis, Tenn.
- Hussey & Co., C. G., 2850 Second Ave., Pittsburgh.
- Huwer Heating Corp., 2375 West Fort St., Detroit 16.
- Huyette Co., Inc., Paul B., 401 N. Broad St., Philadelphia 8.
- Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
- Hyman & Sons, Joseph, Tloga, Livingston and Almond St., Philadelphia 34.

- Ice Cooling Appliance Corp., Morrison, Ill.
- Ideal Commutator Dresser Co., 1084 Park Ave., Sycamore, Ill.
- Ideal Electric & Mfg. Co., E. First & Oak Sts., Mansfield, O.
- Ideal Furnace Co., 901 Fisher Bldg., Detroit 2.
- Ideal Heating Corp., 807 East Gage Ave., Los Angeles.
- Ilg Electric Ventilating Co., 2850 N. Crawford Ave., Chicago 41.
- Illinois Iron & Bolt Co., 918 S. Michigan Ave., Chicago.
- Illinois Testing Laboratories, Inc., 412 N. LaSalle St., Chicago 10.
- Illinois Zinc Co., 2059 W. 47th St., Chicago 32.
- Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago 7.
- Imperial Electric Co., 64 Ira Ave., Akron 9, O.
- Imperial Molded Products Corp., 2925 W. Harrison St., Chicago.
- Independence Stove & Furnace Co., Cor. Hayward & Cottage, Independence, Mo.
- Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6.
- Independent Register Co., 3747 E. 93rd St., Cleveland 5.
- Industrial Engineering Corporation, Terre Haute, Ind.
- Industrial Mfg. & Engineering Co., 3845 N. Ravenswood Ave., Chicago 13.
- Industrial Research, Lansdowne, Pa.
- Industrial Service Laboratories, 7656 W. Forest Home Ave., Milwaukee.
- Ingersoll-Rand Co., 11 Broadway, New York City.
- Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago.
- Inland Steel Co., 38 S. Dearborn St., Chicago 3.
- Insto-Gas Corporation, 1900 E. Jefferson, Detroit 7.
- Insul-Wool Insulation Corp., Wichita 12, Kansas.
- Insulite Div. Minnesota and Ontario Paper Co., 500 Baker Arcade Bldg., Minneapolis 2.
- Inter-Coastal Paint Co., 15th & Southern R. R., East St. Louis, Ill.
- International Engineering, Inc., 1145 Bolander, Dayton 1, O.
- International Engineering Wks., Inc., Framingham, Mass.
- International Heater Co., 101 Park Ave., Utica 2, N. Y.
- International Moistening Co., 489 S. Main St., Providence, R. I.
- International Nickel Co., Inc., 67 Wall St., New York City 5.
- International Register Co., 2620 W. Washington Blvd., Chicago 12.
- International Sales Co., 2045 Evans Ave., San Francisco 24.
- International Steel Co., 1556 Edgar St., Evansville, Ind.
- International Vermiculite Co., 11th & Stanford Ave., Girard, Ill.
- Interstate Machinery Co., Inc., 1433 W. Pershing Road, Chicago 9.
- Interstate Metal Products Company, Inc., 4401 Ogden Ave., Chicago.
- Interstate Sales Co., 1123 Broadway, New York City 10.
- Iona Ventilator Co., Inc., 2821-29 W. Dauphin St., Philadelphia 32.
- Iowa Foundry Co., W. 2nd & Cook, Sioux City, Ia.
- Iowa Paint Mfg. Co., 118-20 Eighth St., Des Moines, Ia.
- Iron Fireman Mfg. Co., 3121 W. 106th St., Cleveland 11.
- Irving Varnish and Insulator Co., 6 Argyle Terrace, Irvington 11, N. J.
- Iwan Brothers, Inc., 1503 Prairie Ave., South Bend 14, Ind.

- Jackson-Bangor Slate Co., Pen Argyl, Pa.
- Jackson Co., Byron, P. O. Box 2017, Terminal Annex, Los Angeles 54.
- Jackson & Church Co., 321 N. Hamilton St., Saginaw, Mich.

- Jackson Oil Burner Co., 4385 Pacific Ave., Detroit.
- Jackson Sheet Metal Works, 3012 Washington Ave., Ogden, Utah.
- Jacobs Co., B. & J., 1725 Johns St., Cincinnati.
- Jacobson Machine Works, Inc., A. E., 1090 Tenth Ave., S. E., Minneapolis.
- Jaden Mfg. Co., 1601 W. 2nd St., Hastings, Nebr.
- Jamar Co., Walker, 367 S. First Ave., E., Duluth, Minn.
- James Regulator Co., Inc., Peacock St., Pottsville, Pa.
- Jamestown Metal Corp., 104 Blackstone Ave., Jamestown, N. Y.
- Jamieson Mfg. Co., 820 Eagle Ford Road, Dallas, Tex.
- Janette Mfg. Co., 556 W. Monroe St., Chicago 6.
- Jefferson Electric Co., 25th & Madison St., Bellwood, Ill.
- Jefferson Machine Tool Co., Fourth, Cutter & Sweeney Sts., Cincinnati.
- Jessop Steel Co., Lock Box 489, Washington, Pa.
- Jewel Mfg. Co., 1841 University Ave., St. Paul 4, Minn.
- Jiffy Manufacturing Co., Hillside, N. J.
- Jiggers, Inc., 215 W. Illinois St., Chicago.
- Joal Mfg. Corp., 2058 Canton St., Toledo.
- Johns-Manville, 22 E. 40th St., New York City 16.
- Johnson Bronze Co., 460 S. Mill St., New Castle, Pa.
- Johnson Co., Lloyd S., 2241 Indiana Ave., Chicago 16.
- Johnson Manufacturing Corporation, Albion, Mich., and Chrysler Building, New York City.
- Johnson Co., S. T., 940 Arlington Ave., Oakland 8, Calif., and 401 N. Broad St., Philadelphia.
- Johnson Fan & Blower Corp., 1319 W. Lake St., Chicago.
- Johnson Gas Appliance Co., 520 "E" Ave., N. W., Cedar Rapids, Ia.
- Johnson, Inc., William, Brenner & Kent Sts., Newark 3, N. J.
- Johnson Ladder & Shoe Co., Eau Claire, Wisconsin.
- Johnson Service Co., 507 E. Michigan St., Milwaukee.
- Johnson & Chapman Co., 2925 Carroll Ave., Chicago.
- Johnston Co., Wm. W., 115 Bayard St., Dayton, O.
- Johnston Gas Furnace Corp., 11847 Vose St., North Hollywood, Calif.
- Johnston Tin Foil & Metal Co., 6100 S. Broadway, St. Louis 11.
- Joliet Heating Corp., 1403 Herkimer St., Joliet, Ill.
- Jones & Laughlin Steel Corp., Third Ave. & Ross St., Pittsburgh 30.
- Jones Foundry & Machine Co., W. A., 4401 W. Roosevelt Rd., Chicago 24.
- Jones Products Corporation, Ferndale, Mich.
- Jordan & Co., Paul R., 311 E. South St., Indianapolis.
- Juniper Elbow Company, Inc., 72-15 Metropolitan Ave., Middle Village, L. I., N. Y.

K

- Kals Sunrise Works, 5659 Linwood Ave., Detroit.
- Kaiser Co., H. S., 3336 Franklin Blvd., Chicago.
- Kalamazoo Tank & Silo Co., Machine Tool Div., 508 Harrison St., Kalamazoo 16, Mich.
- Kane Mfg. Corporation, Kane, Pa.
- Katelman Foundry & Mfg. Co., Third Ave. & Eleventh St., Council Bluffs, Iowa.
- Kauffman Air Conditioning Corp., 4336 W. Pine St., St. Louis.
- Kaufman Co., H. J., 13215 Roselawn Ave., Detroit 4.
- Kaustine Company, Inc., Perry, N. Y.
- Kawneer Co., Niles, Mich.
- Kaybar Burner Corp., 4545 Cottage Grove Ave., Chicago.
- Kaye & McDonald, Inc., 92 Franklin Ave., West Orange, N. J.
- Keasbey Co., Robert A., 139 W. 19th St., New York City.
- Keasbey & Mattison Co., Butler Ave., Ambler, Pa.
- Keckley Company, O. C., 400 W. Madison St., Chicago 6.
- Kehm Corporation, 135 S. LaSalle St., Chicago 3.
- Keith Furnace Co., Dean Ave. at E. 26th, Des Moines 17, Ia.
- Keldur Corp., 420 Lexington Ave., New York City 17.
- Keller Tool Company, P. O. Box 268, Grand Haven, Mich.
- Kelley Manufacturing Co., P. O. Box 17, Houston, Texas.
- Kelsey Heating Co., Inc., 277 James St., Syracuse, N. Y.
- Kelvinator Division, Nash-Kelvinator Corp., 14250 Plymouth Rd., Detroit 32.
- Kelvin-White Co., 90 State St., Boston 9.
- Kennard Corporation, 4821 Easton Ave., St. Louis 13.
- Kennedy, Inc., David E., 58 Second Ave., Brooklyn, N. Y.
- Kent Co., Inc., 167 Canal St., Rome, N. Y.
- Kent & Co., Inc., J. King, 6477 Manchester Ave., St. Louis.
- Kerentoff, G. L., 2218 Reading Road, Cincinnati 2.
- Kernchen Co., 333 N. Michigan Ave., Chicago.
- Kester Solder Co., 4201 Wrightwood Ave., Chicago 39.
- Keystone Asphalt Products Co., 43 E. Ohio St., Chicago 11.
- Keystone Carbon Co., Inc., St. Marys, Pa.
- Keystone Flashing Company, 2310 N. 28th St., Philadelphia 32.
- Kidder Mfg. Co., Inc., J. F., 426 Colchester Ave., Burlington, Vt.
- Kieley & Mueller, Inc., 2013 43rd St., North Bergen, N. J.
- Kimberly-Clark Corp., Neenah, Wis.
- King Metal Co., 414 N. W. Fourth St., Oklahoma City, Okla.
- King Ventilating Co., Box 178, Owatonna, Minn.
- Kingston Products Corporation, 1415 N. Webster, Kokomo, Ind.
- Kinnear Mfg. Co., P. O. Box 598, Columbus 16, O.
- Kirk & Blum Mfg. Co., 2883 Spring Cove Ave., Cincinnati 25.
- Kisco Company, Inc., 39th and Choteau, St. Louis 10.

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Klaine Company, F. A., Front and Central, Cincinnati 2.
 Klauer Mfg. Co., 9th & Washington St., Dubuque, Ia.
 Klee Co., George B., 2162 Dana Ave., Cincinnati 7.
 Kleenaire Corp., 409 Jefferson St., Stevens Points, Wis.
 Kleen-Heat, Inc., 1823 Carroll Ave., Chicago.
 Klein Stove Co., Trenton Ave. & Tioga St., Philadelphia.
 Klenk's Aviation Snips, 107 E. 5th St., Wilmington, Del.
 Klipfel Mfg. Co., 2651 W. Harrison St., Chicago 12.
 Kluegel & Co., E., 187 W. Kellogg Blvd., St. Paul, Minn.
 Knickerbocker Co., 603 Liberty St., Jackson, Mich.
 Knight, Maurice A., Kelley Ave., Akron, O.
 Knowles Mushroom Ventilator Co., 11 Label St., Montclair, N. J.
 Kol-Master Corp., Oregon, Ill.
 Koons Furnace Co., 219 W. Van Buren, Danville, Ill.
 Kopperman & Sons, Joseph, 316 New St., Philadelphia 6.
 Koppers Co., Inc., Koppers Bldg., Pittsburgh 19.
 Korfund Co., Inc., 48-15 32nd Pl., Long Island City 1, N. Y.
 Korth Oil Burner Corp., 123 Hawthorne St., Roselle Park, N. J.
 Korts Blower Mfg. Co., 117 Michigan St., N. W., Grand Rapids, Mich.
 Kraissel Co., Inc., Terhune & Williams Aves., Hackensack, N. J.
 Kraker, Henry, 54 W. 14th St., Holland, Mich.
 Kramer Bros. Foundry Co., 17 Dell St., Dayton 4, O.
 Kramer Trenton Co., 626 Brunswick Ave., Trenton 5, N. J.
 Krauser-Boyd, Inc., 553 River Road, North Tonawanda, N. Y.
 Kraus Mfg. Co., Charles E., 929 W. Main St., Louisville 2, Ky.
 Krehbiel Co., J. H., 425 N. Crawford Ave., Chicago.
 Kresky Mfg. Co., 307 Third St., Petaluma, Calif.
 Kruse Company, 353 W. 16th Pl., Indianapolis.

L

Laclede-Christy Clay Products Co., 411 N. Seventh St., St. Louis.
 Laclede Steel Co., 1317 Arcade Bldg., St. Louis 1.
 Laco Oil Burner Co., 238 Union St., Griswold, Ia.
 La Crosse Steel Roofing & Corrugating Co., 227 Jay St., La Crosse, Wis.
 LaDel Conveyor & Mfg. Co., S. Broadway & Mill Ave., New Philadelphia, O.
 Ladon Co., 902 S. Wabash Ave., Chicago.
 Lamb & Ritchie Co., 250 Albany St., Cambridge, Mass.
 Lamneck Products, Inc., 1025 Lamneck St., Middletown, Ohio.
 Landis & Gyr, Inc., 104 Fifth Ave., New York 11.
 Langsenkamp Co., F. H., 229 E. South St., Indianapolis.
 Larkin Coils, Inc., 519 Fair St., S. E., Atlanta 1, Ga.
 Lastik Products Co., Inc., 1106 Keenan Bldg., Pittsburgh.
 Lau Blower Co., 2005 Home Ave., Dayton 7, O.
 Layne & Bowler, Inc., Box 215, Hollywood Sta., Memphis 8, Tenn.
 Leader Iron Works, Inc., 2841 N. Jasper St., Decatur 60, Ill.
 Leahy Manufacturing Co., 1804 E. 8th St., Los Angeles.
 Lecourtenay Co., 5 Maine St., Newark 5, N. J.
 Ledkote Products Co., 35-01 Vernon Blvd., Long Island City, N. Y.
 Lee Co., K. O., P. O. Box 35, Aberdeen, S. D.
 Lee & Son, Thomas, 128-132 W. Second St., Cincinnati 2.
 Leeds & Northrup Co., 4970 Stenton Ave., Philadelphia 44.
 Lees, John, Div., Serriek Corp., Muncie, Ind.
 Leeson Air Conditioning Corporation, 14631 Meyers Rd., Detroit 27.
 Leffell & Co., James, 426 East St., Springfield, O.
 Leigh Fan & Blower Co., Front & Linden Sts., Allentown, Pa.
 Lehon Company, 4425 Oakley Ave., Chicago 9.
 Leland Electric Co., Inc., 1501 Webster St., Dayton, O.
 Lenk Mfg. Company, Newton Lower Falls 62, Mass.
 Lennox Furnace Co., 200 S. 12th Ave., Marshalltown, Iowa; 1705 Olentangy River Rd., Columbus, Ohio; 400 N. Midler Ave., Syracuse, N. Y.
 Leslie Welding Co., 2943 Carroll Ave., Chicago.
 Levow, David, 308 W. 20th St., New York City 11.
 Levy Bros. Company, 2334-2246 E. 38th St., Los Angeles.
 Lewellen Mfg. Co., Columbus, Ind.
 Lewin-Mathes Company, Lewin Metals Div., 12th & Chateau Sts., St. Louis 2.
 Lewis & Co., Inc., Chas. S., 2207 Pine St., St. Louis 3.
 Lewis Laboratories, Inc., Paul, 922 N. 4th St., Milwaukee 3.
 Libbey-Owens-Ford Glass Co., Box 1765 & 1766, Toledo 3, Ohio.
 Libert Machine Co., 324 N. Roosevelt St., Green Bay, Wis.
 Lignum-Vitae Products Corp., 96 Boyd Ave., Jersey City, N. J.
 Lincoln Electric Co., 12818 Colt Rd., Cleveland 1.
 Linde Air Products Co., 30 E. 42nd St., New York City 17.
 Lindermere Machine & Tool Co., Inc., 12233 Coyle Ave., Detroit.
 Lindsay and Lindsay, 222 W. Adams St., Chicago 6.
 Linear Packing & Rubber Co., Inc., State Road & Levick St., Tacony, Philadelphia 35.
 Link-Belt Co., Stoker Div., 2410 W. 13th St., Chicago 8.
 Lion Mfg. Corp., 2640 W. Belmont Ave., Chicago.
 Liquefied Gas Appliance Co., Mara, Pa.
 Liquid Carbonic Corp., 3100 S. Kedzie Ave., Chicago.
 Lisabarger & Son, Inc., Marks, 23-01 Borden Ave., Long Island City, N. Y.
 Little Burner Co., Inc., H. C., 2nd & Lincoln, San Rafael, Calif.
 Little Janitor Furnace Clock Co., 621 Broadway, New York City.
 Littleford Bros., Inc., 453 E. Pearl St., Cincinnati 2.

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Livingston Repair, South Fountain St., Marshall, Mich.
 • Lockformer Co., 4615 Arthington St., Chicago 44.
 Lockjoint Wood Products Co., 1721 Mildred Ave., Wichita 7, Kan.
 Logan-Long Co., 37 W. Van Buren St., Chicago.
 Lonergan Manufacturing Co., Albion, Mich.
 Lonn Mfg. Co., Inc., 500 N. Dearborn St., Chicago.
 Lookout Bolter & Mfg. Co., Manufacturers Road, Chattanooga, Tenn.
 Lord Mfg. Co., 1641 W. 12th St., Erie, Pa.
 Lovejoy Flexible Coupling Co., 5072 W. Lake St., Chicago 44.
 Lucas & Company, Inc., John, 322 Race St., Philadelphia.
 Ludowici-Celadon Co., 104 S. Michigan Ave., Chicago.
 Lukens Metal Co., Thos. F., Hedley & Bath Sts., Philadelphia.
 Lukens Steel Co., 308 S. First Ave., Coatesville, Pa.
 Lumm Co., A. H., 2512 Albion St., Toledo 6, O.
 Lundy Co., E. A., 420 Lexington Ave., New York 17.
 Lyman Co., H. B., Southampton, Mass.
 Lynch Manufacturing Corporation, Defiance, O.
 Lyon Conklin & Co., Inc., Race & McComas Sts., Baltimore 30.

M

Maas & Waldstein Co., 438 Riverside Ave., Newark 4.
 McAlear Mfg. Co., 1901 S. Western Ave., Chicago 8.
 McClure Builders' Supply Co., East Palestine, O.
 McCord Corporation, 2587 E. Grand Blvd., Detroit 11.
 McCorkle Co., D. H., Sixth & Bancroft Way, Berkeley 2, Calif.
 • McDonnell & Miller, 400 N. Michigan Ave., Chicago 11.
 McIlvaine Products, Inc., 1516 Callowhill St., Philadelphia 30.
 McKay Co., York, Pa.
 McLeod & Henry Co., Inc., 395A First St., Troy, N. Y.
 McPherson Furnace & Supply Co., 1805 N. E. 2nd Ave., Portland 12, Ore.
 McQuay, Inc., 1600 Broadway, N. E., Minneapolis.
 Made-Rite Furnace & Fittings Co., 10th & Monroe St., Newport, Ky.
 MaGill Foundry & Furnace Works, P. H., 413 E. Oakland Ave., Bloomington, Ill.
 Mahon Co., R. C., 8650 Mt. Elliott Ave., Detroit.
 Maid-O'-Mist, Inc., 215 N. Aberdeen St., Chicago 7.
 Main Cornice Works, 1416 N. Main St., Los Angeles.
 • Majestic Co., 733 Erie St., Huntington, Ind.
 Majestic Flashing Company, Reisterstown Rd. at Elgin Ave., Baltimore 17.
 Majestic Furnace Co., 1723 Westlake Ave., N., Seattle, Wash.
 Malco Gear Co., 13904 Lincoln Ave., Dolton, Ill.
 Mail Tool Company, 7740 South Chicago Ave., Chicago 19.
 Malleable Iron Fittings Co., Lock Box 231, Branford, Conn.
 Mallory Sales Co., 13904 Lincoln Ave., Dolton, Ill.
 Manhattan Perforated Metal Co., Inc., 43-17 37th St., Long Island City 1, N. Y.
 Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., 61 Willett St., Passaic, N. J.
 Manheim Manufacturing and Belting Co., Manheim, Pa.
 Manning, Maxwell & Moore, Inc., 11 Elias St., Bridgeport, Conn.
 Manufacturer's Fin Coil Co., 2505 S. Pulaaki Rd., Chicago 23.
 Maple City Furnace Co., 605 S. Main St., Monmouth, Ill.
 Maple Valley Mfg. Co., First St., Mapleton, Ia.
 Maplewood Machinery Co., 2634 Fullerton Ave., Chicago 47.
 Marathon Electric Mfg. Corp., Cherry & Randolph Sts., Wausau, Wis.
 Marblehead Lime Co., 160 N. LaSalle St., Chicago.
 Marble-Card Electric Co., Gladstone, Mich.
 Marlon Furnace Co., 1441 Brooklyn Ave., Detroit.
 Marley Chemical Co., 6537 Russell St., Detroit.
 • Marley Co., 3001 Fairfax Rd., Kansas City 15, Kan.
 Marlin-Rockwell Corporation, Jamestown, N. Y.
 Marlo Coil Company, 6135 Manchester Ave., St. Louis.
 Marquette Mfg. Co., Inc., 401-409 Johnson St., N. E., Minneapolis, Minn.
 Marsh Corporation, Jas. P., 2073 Southport Ave., Chicago 14.
 Marsh Lumber Co., Inc., 535-611 Tuscarawas Ave., Dover, O.
 Marshall Furnace Co., Dobbins & Hanover Sts., Marshall, Mich.
 Marshallan Mfg. Co., 1061 W. 11th St., Cleveland.
 • Marshalltown Mfg. Co., 901 E. Nevada St., Marshalltown, Ia.
 Martens & Stormoen, 15 Hathaway St., Boston 10.
 Martin Fan & Blower Co., 4634 W. 21st Place, Chicago 50.
 Martin, J. O., and C. U., 647 Minna St., San Francisco.
 Martin-Parry Corp., W. Market St., York, Pa.
 Martocello & Co., Jos. A., 229 N. 13th St., Philadelphia 7.
 Mason-Nellan Regulator Co., 1190 Adams St., Dorchester, Boston 24.
 Mason & Sons, F. E., Batavia, N. Y.
 Masonite Corp., 111 W. Washington St., Chicago 2.
 Master Electric Co., 126 Davis Ave., Dayton 1, O.
 Matthiessen & Hegeler Zinc Co., LaSalle, Ill.
 Maur Engineering, 2525 Golfax St., Evanston, Ill.
 Maurath, Inc., 7309 Union Ave., Cleveland.
 • Maurey Mfg. Co., 2915 S. Wabash Ave., Chicago 16.
 • Maxwell Manufacturing Co., 519 S. Main St., Temple, Tex.
 • May-Fiebeger Co., S. 21st St., Newark, O.
 • Mayflower Air Conditioners, Inc., 5th Floor, Finch Industrial Bldg., 5th & Wacouta, St. Paul, Minn.

Mayflower Oil Burner Corp., 5002 Hudson Blvd., West New York, N. J.

Mayne Products Co., 324 Harries Bldg., Dayton 2, O.

May Oil Burner Corp., Maryland Ave. & Oliver St., Baltimore.

Maysteel Products, Inc., Horicon St., Mayville, Wis.

Maze Co., W. H., Peru, Ill.

Medart Co., 3500 DeKalb St., St. Louis.

Meier Electric & Machine Co., 3525 E. Washington St., Indianapolis 7.

Mellish & Murray Co., 1715 Carroll Ave., Chicago.

Merchant & Evans Co., 2035 Washington Ave., Philadelphia 46.

• Mercoird Corp., 4201 Belmont Ave., Chicago 41.

Mercury Clutch Corporation, 2049 Dueber Ave., S. W., Canton 6, O.

Meriam Instrument Co., 10920 Madison Ave., Cleveland 2.

Merkle-Korff Gear Co., 217 N. Morgan St., Chicago.

Mesker & Co., Geo. L., 400 N. W. First St., Evansville 8, Ind.

Metal Door & Trim Co., La Porte, Ind.

Metal Marker Co., 1380 E. 40th St., Cleveland.

Metal & Thermit Corp., 120 Broadway, New York City 5.

Metaloid Company, 5815 Kinsman Road, Cleveland 4.

Metropolitan Refining Co., 23 50th Ave., Long Island City, N. Y.

Metzner Stove Repair Co., 515 Wyandotte, Kansas City 6, Mo.

• Meyer & Bro. Co., F., 1313 S. Adams St., Peoria, Ill.

• Meyer Furnace Co., 1300 S. Washington St., Peoria 2, Ill.

Meyer Mfg. Co., 2536 Fourteenth St., Detroit 16.

Meyers Fuel Saver Co., Inc., 313 W. Milwaukee St., Janesville, Wis.

Michell Air Conditioning Co., Inc., 1725 State St., Schenectady, N. Y.

Michigan Tank & Furnace Corp., Lochinvar Products Div., 1401 Prairie Ave., Detroit 4.

Micro Products Co., 20 N. Wacker Dr., Chicago 6.

Middleton Mfg. & Sales Co., 125 N. First St., Minneapolis.

Midland Paint & Varnish Co., 9115 Reno Ave., Cleveland 5.

Mid-States Equipment Co., 2429 S. Michigan Ave., Chicago 16.

Midwest Aluminum Products, Inc., 123 E. Pittsburgh Ave., Milwaukee.

Midwestern Supply Co., 1106 N. Clinton Blvd., Bloomington, Ill.

Milburn Co., Alexander, 1426 W. Baltimore St., Baltimore.

• Milcor Steel Co., 4117 W. Burnham St., Milwaukee 4.

Miller Co., Meridan, Conn.

Miller Heat-O-Meter Company, 4385 N. Green Bay Ave., Milwaukee 12.

Miller & Doing, 58 York St., Brooklyn, N. Y.

Miller & Son, C. Arthur, 202-204 S. Main St., Elmira, N. Y.

Miller Electric Mfg. Co., Inc., 905 N. Meade St., Appleton, Wis.

Miller Floor Furnace Co., 741 E. 14th St., Oakland, Calif.

Millers Falls Co., 57 Wells St., Greenfield, Mass.

Mill-Rose Co., 2498 E. 79th St., Cleveland, O.

Mills Corp., Elmer E., 153 W. Huron St., Chicago 10.

Mills Novelty Co., 4110 W. Fullerton Ave., Chicago.

Milwaukee Brush Mfg. Co., 2236 N. 30th St., Milwaukee.

Milwaukee Gas Specialty Company, 2025 W. Clybourn, Milwaukee.

Mineral Insulation Co., 103rd & South West Highway, Chicago Ridge, Ill.

• Minneapolis-Honeywell Regulator Co., 2726 Fourth Ave., S. Minneapolis 8.

Minnesota Mining & Manufacturing Co., 900 Fauquier Ave., St. Paul 6.

Minn-Kota Foundry & Mfg. Co., 201 Second St. N., Fargo, N. D.

Minster Machine Co., 270 W. 5th St., Minster, Ohio.

Misener Mfg. Co., Inc., 326 E. Washington St., Syracuse 2, N. Y.

Mississippi Glass Company, 200 Fifth Ave., New York 10.

Mission Water Heater Co., 7101 McKinley Ave., Los Angeles 1.

Mitchell & Smith, Incorporated, Mineral Felt, Div., 9501 Copland Ave., Detroit 17.

Modern Engineering Co., 3411 Pine Blvd., St. Louis 3.

Modine Mfg. Co., 11th St., Racine, Wis.

Moeller Instrument Co., 132nd St. & 89th Ave., Richmond Hill, N. Y.

Moëchl-Edwards Corrugating Co., Inc., P. O. Box 1115, Cincinnati.

Mohawk Asphalt Heater Co., Frankfort, N. Y.

Mohler Co., J. K., The, 151 Church Ave., Ephrata, Pa.

Monarch Engineering Company, 600-600 Linden Ave., Dayton, O.

Monarch Furnace Fittings Manufacturers, 4040 W. Lake St., Chicago.

Monarch Heating Co., 4661 Alger St., Los Angeles.

Monarch Mfg. Works, Inc., Salmon & Westmoreland Sts., Philadelphia 34.

Moncrief Furnace Co., P. O. Box 1673, Atlanta 1, Ga.

Moncrief Furnace & Mfg. Co., Inc., 3903 Main St., Dallas, Tex.

Monitor Controller Co., 51 S. Gay St., Baltimore 2.

Monogram Combustion Chamber Co., 3645 Cuthbert St., Philadelphia.

Montag Stove & Furnace Works, 2011 N. Columbia Blvd., Portland, Ore.

Montgomery Brothers, 61 Fremont St., San Francisco.

Moore Corp., Benton St., Joliet, Ill.

Moran Flexible Steam Joint Co., 217 W. Main St., Louisville, Ky.

Morey, Dan, 816 S. Robertson Blvd., Los Angeles 35.

Morris Machine Works, 31 E. Genesee St., Baldwinville, N. Y.

• Morrison Products, Inc., 16816 Waterloo Rd., Cleveland.

• Morrison Steel Products, Inc., 601 Amherst St., Buffalo 7.

Morse Chain Co., Box 568, Ithaca, N. Y.

Mortell Co., J. W., Hobbie Ave. & Big Four R. R., Kankakee, Ill.

Motex Metal Process Corporation, 4473-4475 W. Jefferson Ave., Detroit 9.

Mountain States Equipment Co., 1235 Speer Blvd., Denver 4, Colo.

• Mt. Vernon Furnace & Mfg. Co., P. O. Box 213, Mt. Vernon, Ill.

Mueller Brass Co., 1925 Lapeer Ave., Port Huron, Mich.

Mueller Co., 512 W. Cerro Gordo St., Decatur 70, Ill.

• Mueller Furnace Co., L. J., 2005 W. Oklahoma Ave., Milwaukee 7.

Mullins Mfg. Corp., Warren, O.

Multi-Cell Sales Corp., 3420 Nicollet Ave., Minneapolis 8.

Muncie Gear Works, Inc., 700 N. Wysor, Muncie, Ind.

Mundet Cork Corp., 65 S. 11th St., Brooklyn 11.

Mundt & Sons, Charles, 53 Fairmont Ave., Jersey City 4, N. J.

Munn and Steele, Inc., 130 Lister Ave., Newark 5, N. J.

Murray Co., 3200 Canton Ave., Dallas, Tex.

Murray Corporation of America, 7700 Russell St., Detroit.

Murray Manufacturing Co., D. J., 1002-24 Third St., Wausau, Wis.

Murray Tile Co., Cloverport, Ky.

Myers & Bro. Co., The, F. E., Ashland, O.

Myers Electric Co., 410 Third Ave., Pittsburgh 19.

Myers Ladder Equipment Co., 3121 Buena Vista, Madison, Wis.

N

Nash Engineering Co., 309 Wilson Ave., South Norwalk, Conn.

National Alroil Burner Co., Inc., 1284 E. Sedgley Ave., Philadelphia 34.

National Brass Co., 1603 Madison Ave., Grand Rapids 2, Mich.

National Carbon Company, Inc., 30 E. 42nd St., New York 17.

National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6.

National Engineering & Manufacturing Co., 213 W. 19th St., Kansas City, Mo.

National Engineering Products, Inc., Commerce & Savings Bldg., Washington.

National Fireproofing Corp., 202 E. Ohio St., N. S., Pittsburgh.

National Foundry & Furnace Co., Station "B," Dayton 7, O.

National Gypsum Co., 325 Delaware Ave., Buffalo 2.

National Heater Company, 401 Essex Bldg., Minneapolis 2.

National Lead Co., 111 Broadway, New York City 6.

National Lock Co., Inc., Rockford, Ill.

National Machine Tool Co., 1536 Clark St., Racine, Wis.

National Machine Gas Burner Div. Mid-Continent Metal Products Co., 122 S. Michigan, Chicago 3.

National Mfg. Corp., 151 Fillmore Ave., Tonawanda, N. Y.

National Manufacturing & Engineering Co., 1441 Brooklyn Bldg., Detroit.

National Metal Fabricators, 2136 S. Sawyer Ave., Chicago 23.

National Safety Device Co., 836 W. Hubbard St., Chicago.

National Screw & Mfg. Co., 2440 E. 75th St., Cleveland.

National Sheet Metal Co., 1617-1629 Water St., Peru, Ill.

National Steam Pump Co., 701 W. Johnson St., Upper Sandusky, O.

National Super Service Co., 1944 N. 13th St. Toledo 2, O.

National Time & Signal Corp., 600 E. Milwaukee Ave., Detroit.

Nebel Manufacturing Co., P. O. Box 3942, Shaker Sq. Station, Cleveland 20.

Neemes Foundry, Inc., 286 First St., Troy, N. Y.

Neilson Chemical Co., 6564 Benson St., Detroit 7.

Nelson Co., 2604 4th Ave., Detroit.

• Nelson Corporation, Herman, 1824 Third Ave., Moline, Ill.

Nelson Mfg. Co., B. F., 401 Main St., N. E., Minneapolis 13.

Nesbitt, Inc., John J., State Rd. & Rhawn St., Philadelphia 36.

Nevinger Manufacturing Co., Inc., Greenville, Ill.

New-Aire Blower Co., 23768 Michigan Ave., Dearborn, Mich.

New Albany Machine Mfg. Co., E. 10th & Water Sts., New Albany, Ind.

New Delphos Mfg. Co., 102-124 S. Pierce St., Delphos, O.

New Departure, Div. General Motors Corp., Bristol, Conn.

New Haven Copper Co., Seymour, Conn.

New Jersey Zinc Co., 160 Front St., New York City 7.

Newman Brothers, Inc., 662-670 W. 4th St., Cincinnati 3.

New Mission Htg. & Vent. Co., 3401 Mission St., San Francisco.

New Monarch Machine & Stamping Co., 406 S. W. 9th St., Des Moines, Ia.

New Plastic Corporation, 1017 N. Sycamore, Hollywood 33, Calif.

Newport Rolling Mill Co., Div. Andrews Steel Co., 9th & Lowell Sts., Newport, Ky.

New Way Products Company, 955 Spitzer Bldg., Toledo, O.

New York Blower Co., 3155 Shields Ave., Chicago 16.

Niagara Blower Co., 6 E. 45th St., New York City 17.

• Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11.

Nice Ball Bearing Co., 30th and Hunting Park Ave., Philadelphia 40.

Nielco Chemical Co., 6564 Benson St., Detroit.

Niles Rolling Mill Co., Niles, O.

Niles Steel Products Division, Republic Steel Corp., 465 Walnut St., Niles, Ohio.

Norge Heating & Conditioning Div., Borg-Warner Corp., 12345 Kercheval Ave., Detroit 14.

Norgren Co., C. A., 222 Santa Fe Dr., Denver, Colo.

Norma-Hoffmann Bearings Corp., Stamford, Conn.

Norris Airless Painting Machinery Corp., 96 Greenwich Ave., Greenwich, Conn.

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Norristown Magnesia & Asbestos Co., Washington St., Below Ford St., Norristown, Pa.
 North American Fibre Products Co., National Building, Cleveland 13.
 North Bangor Slate Co., Bangor, Pa.
 Northern Blower Co., 6409 Barberton Ave., Cleveland 2.
 Northern Furnace & Supply Co., 25th St. & 2nd Avenue North, Billings, Mont.
 Northern Steel & Stoker Corp., 3100 Prospect Rd., Peoria, Ill.
 Northern Weatherstrip Co., 367 S. 1st Ave., E., Duluth, Minn.
 North Penn Co., 72 Fifth Ave., New York 11.
 Northwest Lead Company, 2700 16th Ave., S. W., Seattle 4, Wash.
 Northwest Stove & Furnace Works, 2345 S. E. Gladstone St., Portland 2, Ore.
 • Northwestern Stove Repair Co., 662 W. Roosevelt Rd., Chicago 7.
 Nortmann-Duffke Co., 2740 S. 32nd St., Milwaukee.
 Norton Brothers, 44 Main St., Greenville, N. Y.
 Norwin Co., East Albion St., Freeport, Ill.
 Norwood Filtration Co., N. Maple St., Florence, Mass.
 Nugent Furnace, Thos., 223 E. 80th St., New York 21.
 NuSteel Company, 1714 S. Ashland Ave., Chicago 8.
 Nu-Way Corp., The, 2416 Fourth Ave., Rock Island, Ill.

O

Oakite Products, Inc., 22 Thomas St., New York 6.
 Oakland Foundry Co., Avenue A & L & N Tracks, Belleville, Ill.
 O'Brien Varnish Co., 101 N. Johnson St., South Bend 21, Ind.
 Ohio Electric Mfg. Co., 5910 Maurice Ave., Cleveland.
 Ohio Foundry and Manufacturing Co., Steubenville, O.
 Ohio Products Co., 16113 Munn Road, Cleveland 15.
 Ohio Wire Products Co., 217 N. Tuscarawas Ave., Dover, Ohio.
 Ohl & Co., Geo. A., 151-161 Oraton St., Newark, N. J.
 Ohmlac Paint & Refining Co., 6550 S. Central Ave., Chicago.
 Oil Devices, 341 E. Ohio St., Chicago 11.
 O'Keefe & Merritt Co., 3700 E. Olympic Blvd., Los Angeles.
 • Olsen Manufacturing Co., The C. A., Elyria, O.
 • Omaha Stove Repair Works, 1206 Douglas St., Omaha 2, Nebr.
 O'Neill-Irwin Manufacturing Co., 316 Eighth Ave., S., Minneapolis 15.
 Orbon Stove Co., L. & N. and Sycamore St., Belleville, Ill.
 Original Metal Forming Machine Co., 952 Twentieth Ave., Seattle, Wash.
 Ormsby-Osterman Company, 3631 Cass Ave., St. Louis.
 Osborn Co., J. M. & L. A., 1541 E. 38th St., Cleveland 14.
 Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14.
 OverSpred Stoker Co., 1702-77 W. Washington St., Chicago 2.
 • Owens-Corning Fiberglass Corp., Nicholas Bldg., Toledo 1, O.
 Ozone Air Company, 928 Cherry St., S. E., Grand Rapids, Mich.

P

Pacific Gas Heating Co., 2943 Twentieth St., San Francisco 10.
 Pacific Lumber Co., 100 Bush St., San Francisco 4.
 Pacific Pump Works, 5716 Bickett St., Hunting Park, Calif.
 Pacific States Felt & Mfg. Co., Inc., 845 Howard St., San Francisco.
 Pacific Steel Boiler Div., United States Radiator Corp., Detroit 31.
 • Packard Electric Div., General Motors Corp., Detroit 2.
 Packham Crimper Co., Oak St. & N. Y. C. Depot, Mechanicsburg, O.
 Packless Metal Products Corp., 31 Winthrop Ave., New Rochelle, N. Y.
 Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
 Paine Company, 2951 W. Carroll Ave., Chicago 12.
 Paint-Point Corporation, 275 Passaic St., Newark, N. J.
 Palmer Co., 2501 Norwood Ave., Norwood, Cincinnati 12.
 Palmer Electric Co., 20 Sproat St., Detroit.
 Palmer Mfg. Co., 3890 E. 91st St., Cleveland.
 • Palmer Manufacturing Corp., 705 W. Jefferson St., Phoenix, Ariz.
 Pan-American Engineering Company, 820 Parker St., Berkeley, Calif.
 Pangborn Corp., Pangborn Blvd., Hagerstown, Md.
 • Paragon Electric Co., 37 W. Van Buren St., Chicago 5.
 Paragon Oil Burner Corp., 75 Bridgewater St., Brooklyn, N. Y.
 Paramount Products Co., 545 Fifth Ave., New York City.
 Park City Cornice Works, Inc., 729 Union Ave., Bridgeport, Conn.
 Parker Appliance Co., 17325 Euclid Ave., Cleveland 12.
 Parker Heating & Manufacturing Co., 1627 Third Ave., S., St. Petersburg, Fla.
 • Parker-Kalon Corp., 190-192 Varrick St., New York City 14.
 Parker Rust-Proof Co., 2177 E. Milwaukee Ave., Detroit 11.
 Parkersburg Iron & Steel Co., Drawer 1070, Parkersburg, W. Va.
 Parks-Cramer Co., P. O. Box 444, Fitchburg, Mass.
 Patent Novelty Company, Fulton, Ill.
 Patten Co., J. V., 200 DeKalb Ave., Sycamore, Ill.
 Patterson Foundry & Machine Co., East Liverpool, O.

Patterson-Sargent Co., St. Clair, Kopp & 38th St., Cleveland.
 • Payne Furnace & Supply Co., 336 N. Foothill Rd., Beverly Hills, Calif.
 Peacard Co., M. A., 195 Dudley St., Roxbury Sta., Boston 19.
 • Peck, Stow & Wilcox Co., Center St., Southington, Conn.
 Pecora Paint Co., 4th St. & Erie Ave., Philadelphia 40.
 Pedrick Tool & Machine Co., 3640 N. Lawrence St., Philadelphia 40.
 • Peerless Electric Co., 2000 W. Market St., Warren, O.
 • Peerless Foundry Co., 1853 Ludlow Ave., Indianapolis.
 Peerless Mfg. Corp., 1400 W. Ormsby St., Louisville 10, Ky.
 Peerless of America, Inc., Marion, Ind.
 Peerless Oil Burner Co., Inc., 3926 Main St., Kansas City, Mo.
 Peerless Pump Div., Food Machinery Co., 301 West Avenue 26, Los Angeles 31.
 Peerless Pump Div., Food Machinery Corporation, 1250 Camden Ave., S. W., Canton 6, Ohio.
 Peninsular Stove Co., 2699 Gratiot Ave., Detroit.
 • Penn Boiler & Burner Mfg. Corp., Fruitville Rd., Lancaster, Pa.
 • Penn Electric Switch Co., Goshen, Ind.
 Penn Supply & Metal Corporation, 1831 N. Fifth St., Philadelphia 22.
 Penn Tool Company, 2415 N. Howard St., Philadelphia 33.
 Penn Ventilating Co., 3252 Goodman St., Philadelphia 40.
 Pennsylvania Engineering Works, 526 S. Jefferson St., New Castle, Pa.
 Pennsylvania Flexible Metallic Tubing Co., 72nd St. & Powers Lane, Philadelphia 42.
 Pennsylvania Furnace & Iron Co., P. O. Box 269, Warren, Pa.
 Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7.
 Pennsylvania Wire Glass Co., 1612 Market St., Philadelphia 3.
 Pentecost & Craft Co., 429 Wabash Ave., Terre Haute, Ind.
 Perfection Grate & Stoker Co., 4 Fisk Ave., Springfield 1, Mass.
 Perfection Stove Co., 7609 Platt Ave., Cleveland 4.
 • Perfex Corp., 500 W. Oklahoma Ave., Milwaukee 7.
 Perkins Machine Co., 4 Perkins Ave., Warren, Mass.
 Perkins Machine Gear Co., Springfield, Mass.
 Perkins & Son, Inc., B. F., Chicopee St., Holyoke, Mass.
 Perkinson & Brown, 412 N. Wolcott Ave., Chicago.
 Permutit Co., 330 W. 42nd St., New York 18, N. Y.
 Pernot & Rich, Inc., 2546 San Fernando Rd., Los Angeles 41.
 Peters-Dalton, Inc., 628 E. Forest Ave., Detroit 1.
 • Peterson Co., B. A., 200 W. Railroad, Dowagiac, Mich.
 Peterson "Freezem" Mfg. & Sales Co., 316 Southwest Blvd., Kansas City, Mo.
 Petroleum Heat & Power Co., P. O. Box 1547, Stamford, Conn.
 Pfeister Chemical Co., 104 Lakeview Ave., Waukegan, Ill.
 Pfeifer, Wm., 416 Greenwich St., New York City.
 Pfening Co., Fred D., 1075 W. 5th Ave., Columbus 8, O.
 Phelps Dodge Copper Products Corp., British American Tube Div., 40 Wall St., New York City.
 Phelps Mfg. Co., 801 Thomas St., Little Rock, Ark.
 Pheoll Manufacturing Co., 5700 Roosevelt Rd., Chicago 50.
 Philadelphia Gear Works, Inc., Erie Ave. and G St., Philadelphia 34.
 Philadelphia Thermometer Co., 915 Filbert St., Philadelphia.
 Philco Corp., Tioga and C Streets, Philadelphia 34.
 Phillips Cooling Tower Co., Inc., 114 Liberty St., New York City 6.
 Phillips Drill Co., 4700 Fifth Ave., Chicago.
 Phoenix Ice Machine Co., 2711 Church St., Cleveland.
 Phoenix Ventilator Co., 1665 63rd St., Brooklyn.
 Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass.
 Platt Products Corporation, 1149 S. Pennsylvania Ave., Lansing, Mich.
 Pier Equipment Mfg. Co., 1440 Milton St., Benton Harbor, Mich.
 Pilley Brush Co., Fort Madison, Ia.
 Pioneer Heat Regulator Division, Master Electric Co., 100 Davis Ave., Dayton 1, O.
 Pioneer Roofing & Sheet Metal Co., 226 N. Main St., Muskogee, Okla.
 Pioneer Water Heater Co., 3005 Andriba St., Los Angeles.
 Pittsburgh Furnace Parts Co., 109 Federal St., Pittsburgh.
 Pittsburgh Electrodryer Corp., P. O. Box 1766, Pittsburgh 30.
 Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh 22.
 Pittston Stove Co., P. O. Box 279, Pittston, Pa.
 Plant Rubber & Asbestos Works, Inc., 537 Brannan St., San Francisco 7.
 Plastergon Wall Board Co., Philadelphia Ave., Buffalo 7.
 Plastic Products Co., 6475 Georgia Ave., Detroit 11.
 Pleasantaire Corp., 329 Tower Bldg., Washington 5.
 Plibrico Jointless Firebrick Co., 1800 Kingsbury St., Chicago 14.
 Plummer Spray Equipment Co., 109 Filmore St., Napoleon, O.
 Plymouth Industries Inc., 1932 Harrison Ave., Plymouth, Ind.
 • Pocahontas Fuel Company, Incorporated, Stoker Div., 340 E. 131st St., Cleveland 8.
 Poe Co., C. W., Mayfield at Lee, Cleveland 18.
 Poe, Ralph W., 306 W. Locust St., Canton, Ill.
 Polk Mfg. Co., 2021-23 Winnebago St., Madison, Wis.
 Pomona Pump, Fairbanks, Morse & Co., 206 E. Commercial St., Pomona, Calif.
 Poole Foundry & Machine Co., 1700 Union Ave., Woodberry Baltimore.
 Portland Stove Fdry. Co., 57 Kennebec St., Portland 2, Me.
 Potomac Mfg. Co., 316 S. 10th St., Philadelphia 7.
 Powermatic Ventilator Company, 4019 Prospect Ave., Cleveland 3.
 Powers Regulator Co., 2720 Greenview Ave., Chicago.

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Practical Instrument Co., 2717 N. Ashland Ave., Chicago.
 Prat-Daniel Corporation, Port Chester, N. Y.
 Precision Control Co., 899 Bryant St., San Francisco.
 Precision Thermometer & Instrument Co., 1434 Brandywine St., Philadelphia 30.
 Preferred Utilities Manufacturing Corp., 1860 Broadway, New York City 23.
 • Premier Furnace Co., Lock Box 150, Dowagiac, Mich.
 Premier Metal Etching Co., 21-03 44th Ave., Long Island City, N. Y.
 Presstite Engineering Co., 3900 Chouteau St., St. Louis 10.
 Primold Products Corp., 103 Park Ave., New York City.
 Propellair, Inc., 1345 Lagonda Ave., Springfield, O.
 Protected Steel Products, McAdam Ave., Washington, Pa.
 Protective Coatings, Incorporated, P. O. Box 56, Stratmoor Station, Detroit 27.
 Pryne & Co., Inc., Box 3307, Terminal Annex, Los Angeles 54.
 Puhl & Hepper Mfg. Co., Inc., 6400 W. Florissant Ave., St. Louis 20.
 Pyott Foundry & Machine Co., 328 N. Sangamon St., Chicago.
 Pyramid Metals Co., 1334 N. Wells St., Chicago.
 Pyrolite Products Co., 1221-31 W. 74th St., Cleveland 2.

Q

Quaker Mfg. Co., 223 W. Erie St., Chicago 10.
 Quick Furnace & Supply Co., 215 Court Ave., Des Moines 9, Ia.
 Quiet-Heat Mfg. Corp., 135 N. J. Railroad Ave., Newark, N. J.
 Quigley Company, Inc., 527 Fifth Ave., New York 17.
 Quimby Pump Div., H. K. Porter Co., Inc., 340 Thomas St., Newark 5, N. J.
 • Quincy Stove Manufacturing Co., 807 S. Front St., Quincy, Ill.

R

R-S Products Corp., 4530 Germantown Ave., Philadelphia 44.
 Racine Stoker Mfg. Co., 1014 Eighth St., Racine, Wis.
 Racine Tool & Machine Co., Erskine & Cook Sts., Racine, Wis.
 • Radiation Furnace Corp., 230 Bond St., Benton Harbor, Mich.
 Radiator Specialty Co., 1722 Dowd Rd., Charlotte 1, N. C.
 Rafter Machine Co., 259 Stephen St., Belleville, N. J.
 Ramey Mfg. Co., 243 N. 5th St., Columbus, O.
 Ramsey Chain Co., Inc., 1028 Broadway, Albany, N. Y.
 Ramtite Co., Div. S. Obermayer Co., 2563 W. 18th St., Chicago.
 Ranco Inc., 601 W. Fifth Ave., Columbus 1, O.
 • Randall Graphite Products Corp., 609 W. Lake St., Chicago 6.
 Ransome Machinery Co., Sub. Worthington Pump & Machinery Corp., Dunellen, N. J.
 Ravenna Furnace & Heating Co., Ravenna, O.
 Rawplug Co., Inc., The, 98 Lafayette St., New York 13.
 Ray Oil Burner Co., 401-499 Bernal Ave., San Francisco 12.
 Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
 Redmond Co., A. G., Owosso, Mich.
 Reed Unit-Fans, Inc., 1001 St. Charles Ave., New Orleans 8.
 Reeves Pulley Co., 1000 N. Wilson St., Columbus, Ind.
 Reeves Steel & Mfg. Co., Dover, O.
 Refinite Corp., Refinite Bldg., Omaha 8.
 Refractory & Insulation Corp., 120 Wall St., New York City 5.
 Refrigeration Appliances, Inc., 923 W. Lake St., Chicago.
 Refrigeration Economics Co., Inc., 1232 Second St. N. E., Canton, Ohio.
 Rega Mfg. Co., 79 Mt. Hope Ave., Rochester 7, N. Y.
 Register & Grille Mfg. Co., Inc., 70 Berry St., Brooklyn 11.
 Reichert Float & Mfg. Co., 2238 Smead Ave., Toledo 6, O.
 Reif-Rexoil, Inc., 37 Carroll St., Buffalo.
 Reilly Tar & Chemical Corp., 1615 Merchants Bank Bldg., Indianapolis 4.
 Reimuller Brothers Company, 9400 Belmont Ave., Franklin Park, Ill.
 Reiner & Campbell Co., Inc., 667 Norwood Terrace, Elizabeth 2, N. J.
 Reliable Gas Products Co., 1024 Second Ave., W. S., Cedar Rapids, Ia.
 Reliable Perforating Co., 2047 N. Wood St., Chicago.
 Reliable Sheet Metal Engineering Co., 4334-50 S. Knox Ave., Chicago.
 Reliance Automatic Lighting Co., 1929 Mead St., Racine, Wis.
 Reliance Electric & Engineering Co., 1088 Ivanhoe Rd. N. E., Cleveland 10.
 Reliance Refrigerating Machine Co., 3401 N. Kedzie Ave., Chicago 18.
 Remco Products Corp., State and Hay Sts., York, Pa.
 Rempe Co., 340 N. Sacramento Ave., Chicago.
 Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
 • Republic Steel Corp., Republic Bldg., Cleveland 1.
 Research Corp., 405 Lexington Ave., New York 17.
 • Research Products Corporation, 1015 E. Washington Ave., Madison 3, Wis.
 Resistoflex Corporation, 39 Plesoen St., Belleville 9, N. J.
 Retinning Manufacturing Co., 3021 Greenvlew Ave., Chicago.

• Revere Copper and Brass, Incorporated, 230 Park Ave., New York City 17.
 Rex Clay Products Company, 14414 Dexter Bldg., Detroit 6.
 Reynolds Electric Company, 2685 W. Congress St., Chicago 12.
 Reynolds Mfg. Co., 412 Prospect N. E., Grand Rapids, Mich.
 Reynolds Manufacturing Co., Springfield, Mo.
 Reynolds Metals Co., Reynolds Metals Bldg., Richmond 19, Va.
 Reznor Mfg. Co., Lock Box 231, Mercer, Pa.
 Rheem Manufacturing Co., Stokermatic Div., 1415 S. State St., Salt Lake City 4, Utah.
 Rhodes, Inc., M. H., 30 Bartholomew Ave., Hartford, Conn.
 Ribside Furnace Co., 119 1/2 Clinton St., Wausau, Wis.
 Richards-Wilcox Mfg. Co., Third St., Aurora, Ill.
 Richmond Fireproof Door Co., Northwest F St., Richmond, Ind.
 Richmond Radiator Co., 535 Fifth Ave., New York 17.
 Riestler & Thesmacher Co., 1526 W. 25th St., Cleveland 13.
 Rigglin Metal Products, Box 267, Kankakee, Ill.
 Riley Stoker Corp., 9 Neponset St., Worcester, Mass.
 Rising & Nelson Slate Co., West Pawlet, Vt.
 Rival Strap Corporation, 308 W. 20th St., New York City 11.
 Riverside Machinery Company, 10632 S. Michigan Ave., Chicago 28.
 Riverton Lime & Stone Co., Inc., Riverton, Va.
 Roan Mfg. Co., 1220 Washington Ave., Racine, Wis.
 Robbins & Myers, Inc., 1345 Lagonda Ave., Springfield, O.
 Roberts-Gordon Appliance Corp., 137 Arthur St., Buffalo 7.
 Roberts Tube Works, 2500 Military Ave., Detroit.
 Robertson, F. L., 56 Rano St., Buffalo.
 Robertson Co., H. H., 2400 Farmers Bank Bldg., Pittsburgh 22.
 Robinson Furnace Co., 4600 W. Monroe St., Chicago.
 Robinson Insulation Co., P. O. Box 1419, Great Falls, Mont.
 Rochester Lead Works, Inc., 380 Exchange St., Rochester 8, N. Y.
 Rochester Mfg. Co., Brighton Station, Rochester 10, N. Y.
 Rock Fleece Company, 115 Durango St., El Paso, Texas.
 • Rock Island Register Co., 2425 Fifth Ave., Rock Island, Ill.
 Rock Island Stove Co., 200 Fourth St., Rock Island, Ill.
 Rockwood Mfg. Co., 1801 English Ave., Indianapolis.
 Roebeling's Sons Co., John A., 640 S. Broad St., Trenton 2, N. J.
 Roesch & Associates, Inc., 120 E. Washington St., Syracuse, N. Y.
 Roessing Mfg. Co., 1616 Noble St., Sharpsburg Sta., Pittsburgh.
 Roller Bearing Co. of America, Whitehead Rd., Trenton 3, N. J.
 Rolyan Corp., 2241 Indiana Ave., Chicago.
 Rome-Turney Radiator Co., Canal St., Rome, N. Y.
 Roper Corp., Geo. D., Blackhawk Park Ave., Rockford, Ill.
 Rosebraugh Co., W. W., 680 S. 17th St., Salem, Ore.
 Rosedale Foundry & Machine Co., Columbus Ave., N. S., Pittsburgh.
 Ross Heater & Mfg. Co., Inc., 1407 West Ave., Buffalo.
 Ross Sprinkler Co., 34 Roberts St., Pasadena, Calif.
 Rotary Mfg. Co., 5718 Long Beach Ave., Los Angeles.
 Roto-Beam Division, Peerless of America, Inc., 333 N. Michigan Ave., Chicago.
 • Round Oak Co., Dowagiac, Mich.
 Roxalin Flexible Finishes, Inc., 800 Magnolia Ave., Elizabeth, N. J.
 Royal Air Conditioning Equipment Co., 1024 Westminster Ave., Alhambra, Calif.
 Royal-Apex Mfg. Corp., 62 Schenectady Ave., Brooklyn, N. Y.
 Royal Ventilator Co., 415 Locust St., Philadelphia 6.
 Royersford Foundry & Machine Co., 55 Main St., Royersford, Pa.
 Ruberoid Co., The, 500 Fifth Ave., New York 18.
 • Ruby Chemical Co., 74 McDowell St., Columbus 8, O.
 • Rudy Furnace Co., Dowagiac, Mich.
 Ruemelin Mfg. Co., 2880 N. Palmer St., Milwaukee 12.
 Ruggles-Klingemann Mfg. Co., 4 Foster Ct., Salem, Mass.
 Ruppriht, Siegfried, 299 S. Atlantic Blvd., Los Angeles 22.
 Russell Electric Co., 342 W. Huron St., Chicago 10.
 Russell Co., F. C., 1836 Euclid Ave., Cleveland.
 Russell Mfg. Co., John M., Box 246, Naugatuck, Conn.
 Rust Products Co. of America, 618 W. Adams St., Chicago.
 Rusticide Products Co., 3125 Perkins Ave., Cleveland.
 Rutland Fire Clay Co., 91 Curtis Ave., Rutland, Vt.
 • Rybolt Heater Co., Miller St., Ashland, O.
 • Ryerson & Son, Inc., Joseph T., 2558 W. 16th St., Chicago.
 Ryniker Steel Products Company, 122-124 N. 25th St., Billings, Mont.

S

S K F Industries, Inc., Front St. and Erie Ave., Philadelphia 24.
 Saffee Glass Co., Stenton Ave. & Loudon St., Philadelphia 44.
 Saino Mfg. Co., Inc., F. L., 70 W. Colorado Ave., Memphis, Tenn.
 St. Charles Mfg. Co., St. Charles, Ill.
 St. Clair Foundry Corp., Beech & Wilson Sts., Centralia, Ill.
 St. Louis Furnace Mfg. Co., 2710 N. 25th St., St. Louis.
 St. Louis Tool Co., 6100 Prescott St., St. Louis, 15.
 St. Paul Corrugating Co., Wabasha & Water Sts., St. Paul 1, Minn.
 • Sall Mountain Co., 176 W. Adams St., Chicago 3.
 • Sampell Time Control, Inc., 600 N. Strong Ave., Spring Valley, Ill.
 Samson Plaster Board Co., Crosby Bldg., Buffalo.
 Sandee Mfg. Co., 3945 N. Western Ave., Chicago.
 Sandberg Co., H. J., 500 N. E. Union Ave., Portland 14, Ore.

• Advertisement in this issue. See Index to Advertisers, page 324.

- Sanders, J. A., Successor to Van Praag Sales, Box 123, Fulton, N. Y.
- Sangamo Electric Co., 1301 N. 11th St., Springfield, Ill.
- Sanmyer Corporation, 1265 W. North Ave., Chicago.
- Sanvin Chemical Products Co., 1617 21st Ave., Moline, Ill.
- Sarco Co., Inc., 475 Fifth Ave., New York City.
- Sarcotherm Controls, Inc., 222 North Bank Dr., Chicago 54.
- Sauerelsen Cements Co., Sharpsburg, Station, Pittsburgh 15.
- Savage Co., W. J., 912 W. Clinch Ave., Knoxville 2, Tenn.
- Saverite Engineering Co., 1031 Clinton St., Hoboken, N. J.
- Sawyer Electrical Mfg. Co., 5701 Smithway, Los Angeles 22.
- Schaefer Brush Mfg. Co., 1025 S. Second St., Milwaukee 4.
- Scaife Company, Oakmont, Pa.
- Schatz Mfg. Co., Fairview, Poughkeepsie, N. Y.
- Schecter Brothers Co., Hancock & Huntington Sts., Philadelphia.
- Scherr Co., Inc., George, 128 Lafayette St., New York 13.
- Schieren Co., Chas. A., 30-38 Ferry St., New York City.
- Schill Mfg. Co., 302 Mansfield St., Crestline O.
- Schmieg Industries, 312-320 Piquette Ave., Detroit 2.
- Schneible Co., Claude B., 2827 25th St., Detroit 32.
- Schoedinger, F. O., 322-358 Mt. Vernon Ave., Columbus 16, O.
- Schundler & Co., Inc., F. E., Insulation Div., 504 Railroad St., Joliet, Ill.
- Schwab Furnace Company, 193 S. Second St., Milwaukee 4.
- Schwab Safe Co., East Maine and Blvd., Lafayette, Ind.
- Schwitzer-Cummins Co., 1125 Massachusetts Ave., Indianapolis 7.
- Sciaky Bros., 4915 W. 67th St., Chicago 38.
- Scientific Tool Company, 400 Linden Ave., Dayton 3, O.
- Scientific Instrument Co., 531-35 W. Larned St., Detroit 26.
- Scott Engineering Co., 23 N. Sixth St., Noblesville, Ind.
- Scott-Newcomb, Inc., 2106 Olive St., St. Louis 3.
- Seoville Mfg. Co., Morency-Van Buren Div., Prairie Ave., Sturgis, Mich.
- Sealkote Corp., 40 S. Clinton St., Chicago.
- Seamlex Co., 27-27 Jackson Ave., Long Island City 1, N. Y.
- Security Manufacturing Co., 1630 Oakland Ave., Kansas City 3, Mo.
- Self-Vulcanizing Rubber Co., Inc., 605 W. Washington Blvd., Chicago.
- Semco Mfg. Co., 118-122 Third Ave., N., Nashville, Tenn.
- Seneca Wire & Mfg. Co., P. O. Box 71, Fostoria, O.
- Sentry Mfg. Co., N. E. Cor. 13th & Grace Sts., Omaha, Nebr.
- Servel, Inc., Electric Refrigeration Div., 119 Morton Ave., Evansville 20, Ind.
- Service Machine Co., 158 Miller St., Elizabeth 4, N. J.
- Service to Industry, Box 133, West Hartford, Conn.
- Shafer Bearing Corp., 1412 W. Washington Blvd., Chicago 7.
- Shakeproof, Inc., 2501 N. Keeler Ave., Chicago.
- Shallcross Co., 48th & Grays Ferry Rd., Philadelphia.
- Shambien Furnace Parts Co., 231-39 First Ave., Pittsburgh.
- Sharon Steel Corp., Drawer 537, Sharon, Pa.
- Shedlov Oil Burners, Inc., 717 Third Ave., S. Minneapolis.
- Sheetlock Co., 4521 N. Clark St., Chicago 40.
- Sheet Metal Mfg. Co., Inc., 953 Myrtle Ave., Brooklyn.
- Sheet Metal Products Co., 320 S. Commercial St., Peoria 2, Ill.
- Sheet Metal Specialty Company, 3rd & Liberty Ave., Pittsburgh.
- Sheldon Slate Products Co., Inc., 5 N. Main St., Granville, N. Y.
- Sherwin-Williams Co., 101 Prospect Ave., N. W., Cleveland 1.
- Shreveport Engineering Co., Inc., 1553-55 Texas Ave., Shreveport, La.
- Sight Feed Generator Co., 14 N. Tenth St., Richmond, Ind.
- Signal Electric Mfg. Co., P. O. Box 75, Menominee, Mich.
- Silent Glow Oil Burner Corp., 1477 Park St., Hartford, Conn.
- Silent Glow Oil Burner Corp., Orange City, Ia.
- Silvercote Products, Inc., 161 E. Erie St., Chicago 11.
- Simplex Ceiling Co., 60 E. 42nd St., New York City 17.
- Simplex Manufacturing Co., 300 North Main St., Fond du Lac, Wis.
- Simplex Oil Heating Corp., 85 Main St., West Orange, N. J.
- Sinker-Davis Co., 230 S. Missouri St., Indianapolis 4.
- Sioux City Foundry and Boiler Co., East 8th & Division Sts., Sioux City, Iowa.
- Sioux Steel Co., Sioux Falls, S. D.
- Sipe & Company, James B., Box 8010, S. Hills Branch, Pittsburgh.
- Siskraft Co., The, 205 W. Wacker Dr., Chicago 6.
- Skilbeck Mfg. Co., 7432 27th Ave., Kenosha, Wis.
- Skilsaw, Inc., 5033 Elston Ave., Chicago 30.
- Skinner Heating & Ventilating Co., Heater Div. of St. Louis Blow Pipe & Heater Co., Inc., 1954 N. 9th St., St. Louis 6.
- Skinner Irrigation Co., 1212 E. Canal St., Troy, O.
- Skuttle Manufacturing Co., 517 E. Larned St., Detroit 26.
- Sly Mfg. Co., W. W., 4736 Train Ave., Cleveland 2.
- Small Motors, Inc., 1322 Elston Ave., Chicago.
- Smith & Co., F. L., 60 E. 42nd St., New York 17.
- Smith Corporation, A. O., 3533 N. 27th St., Milwaukee 1.
- Smith Heater Co., Peter, 6209 Hamilton Ave., Detroit 2.
- Smith & Kanzler Corp., 516 Lidgerwood Ave., Elizabeth 2, N. J.
- Smith Manufacturing Co., Inc., F. A., P. O. Box 509, Rochester 2, N. Y.
- Smith-Raymond Co., 1231-33 Tenth Ave., Columbus, Ga.
- Smith, R. E., 1513 Monroe St., Waukegan, Ill.
- Smith Welding Equipment Corp., 2619-33 Fourth St., S. E., Minneapolis 14.
- Smith, Inc., Winfield H., 114 Eaton St., Springfield, Erie Co., N. Y.
- Smooth-on Mfg. Co., 568-574 Communipaw Ave., Jersey City 4, N. J.
- Snap-On Mfg. Co., 1028 Blue Island Ave., Chicago.
- Snap-On Tools Corporation, Kenosha, Wis.
- Socony Paint Products, Div. of Socony-Vacuum Oil Co., Inc., 26 Broadway, New York City 4.
- Solvay Sales Corp., 42 Rector St., New York.
- Somers, Inc., H. J., 6063 Wabash Ave., Detroit 8.
- Sonneborn Sons, Inc., L., 88 Lexington Ave., New York 16.
- Sonner Burner Co., P. O. Box 903, Winfield, Kan.
- Soss Manufacturing Co., 21777 Hoover Rd., Detroit.
- South Bend Air Products, Inc., 322 E. Colfax, South Bend, Ind.
- Southbridge Roofing Co., Inc., Hartwell & Chapin Sts., Southbridge, Mass.
- Souther Iron Co., E. E., 1952 Kienlen Ave., St. Louis 20.
- Southern States Iron Roofing Co., Stiles Ave. & Louisville Rd., Savannah, Ga.
- Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
- Spear Stove & Heater Co., James, 3430 Chestnut St., Philadelphia.
- Specialty Converters, Inc., East Braintree, Mass.
- Speedmaster Company, 1201 Thacker St., Des Plaines, Ill.
- Speedway Mfg. Co., 1854 S. 52nd Ave., Cicero 50, Ill.
- Spencer Heater Division, The Aviation Corporation, 164 Park St., Williamsport, Pa.
- Spencer Thermostat Co., Unit of Metals & Controls Corp., 34 Forest St., Attleboro, Mass.
- Spencer Turbine Co., 484 New Park Ave., Hartford 6, Conn.
- Spiegel Corporation, G. B., 1901 S. Washtenaw Ave., Chicago 8.
- Sporlan Valve Co., 3723 Commonwealth Ave., St. Louis.
- Spray Engineering Co., 103 Central St., Somerville 45, Mass.
- Spraying Systems Co., 4021F W. Lake St., Chicago 24.
- Sprayo-Flake Co., 2715 Irving Park Blvd., Chicago.
- Sproul-Waldron & Co., Muncy, Pa.
- Spun Steel Corp., 2037 Dueber Ave., S. W., Canton, O.
- Square D Co., 6060 Rivard St., Detroit 11.
- Stafford Co., N., 117 53rd St., Brooklyn 32.
- Stainless & Steel Products Co., 1000 Berry Ave., St. Paul 4.
- Standard Asbestos Mfg. Co., 820-22 W. Lake St., Chicago 7.
- Standard Computing Scale Co., Air Conditioning and Refrigeration Div., 2461 E. Grand Blvd., Detroit 11.
- Standard Engineering Works, 289 Roosevelt Ave., Pawtucket, R. I.
- Standard Fuel Engineering Co., 667 Post Ave., South, Detroit 17.
- Standard Furnace & Supply Co., 413-17 S. Tenth St., Omaha 8.
- Standard Galvanizing Co., 2619 W. Van Buren St., Chicago.
- Standard Heater & Oil Equipment Co., 245 Cornellison Ave., Jersey City 2, N. J.
- Standard Heating & Radiator Co., 104 Second Ave., Pittsburgh 19.
- Standard Lime & Stone Co., 2004 First National Bank Bldg., Baltimore.
- Standard Pressed Steel Co., Jenkintown, Pa.
- Standard Rolling Mills, Inc., 143 Jewel St., Brooklyn.
- Standard Stamping & Perforating Co., 3137 W. 49th Pl., Chicago.
- Standard Steel Spring Co., 2640 E. Fifth Ave., Gary, Ind.
- Standard Thermometer, Inc., 65 Shirley St., Boston.
- Standard Ventilator Co., Lewisburg, Pa.
- Stanley Electric Tool Div., The Stanley Works, 131 Elm St., New Britain, Conn.
- Stanley Mfg. Co., East Monument Ave., Dayton, O.
- Stanley Tools, New Britain, Conn.
- Stanton Heater Co., Martins Ferry, O.
- Star Electric Motor Co., 197 Grove St., Bloomfield, N. J.
- Star Expansion Bolt Co., 147 Cedar St., New York City 6.
- Starr Piano Co., Richmond, Ind.
- State Supply Co., 1273 E. 123rd St., Cleveland 8.
- Sta-Warm Electric Co., Ravenna, Ohio.
- Steamalre Co., Dana Ave. & Newton St., Cincinnati, Ohio.
- Steel Products Engineering Co., 1205 W. Columbia St., Springfield, O.
- Steinhorst & Sons, Inc., Emil, 612 South St., Utica 3, N. Y.
- Stephens-Adamson Mfg. Co., 55 Ridgeway Ave., Aurora, Ill.
- Sterling Electric Motors, Inc., 5401 Anaheim-Telegraph Rd., Los Angeles 22.
- Sterling Foundry Co., Sterling, Ill.
- Ster-Na-Man Fdry. Co., 441 Williams St., Springfield, Ill.
- Stewart Foundry, O. S., 887 E. 67th St., Cleveland.
- Stewart Ice Machine Co., 1046 East 22nd St., Los Angeles.
- Stewart Manufacturing Co., 610 Bloomfield Ave., Bloomfield, N. J.
- Stewart-Rogers, Inc., 3915 Powelton Ave., Philadelphia 4.
- Stiglitz Furnace & Foundry Co., 2007-23 Portland Ave., Louisville, Ky.
- Stok-A-Fire Co., Inc., 6504 Olive Street Road, University City 5, Mo.
- Stokerette Mfg. Co., 4540 Ravenswood Ave., Chicago.
- Stoker-Lad Co., 1111 A St., Tacoma, Wash.
- Stoker Products, Inc., 221 W. Prairie Ave., Decatur, Ill.
- Stokerunit Corp., 4548 W. Mitchell St., Milwaukee 14.
- Stokes, Jr., J. W., successor to American Coppercote, Inc., 189 Montague St., Brooklyn, N. Y.
- Stossel & Sons, Carl, Front Royal, Va.
- Stove Manufacturers Corporation, 182 Mulberry St., Newark, N. J.
- Stow Mfg. Co., Inc., 445 State St., Binghamton, N. Y.
- Strandwitz & Co., Inc., W. J., Jefferson and Master St., Camden, N. J.
- Stratton & Terstegge Co., 1501 W. Main St., Louisville 1.

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- Streamline Pipe & Fittings Div., Mueller Brass Co., 1925 Lapeer Ave., Port Huron, Mich.
 Streine Tool & Mfg. Co., New Bremen, Ohio.
 Structural Slate Co., Robinson Ave., Pen Argyl, Pa.
 Struthers Dunn, Inc., 1315 Cherry St., Philadelphia.
 • Sturtevant Co., B. F., Damon St., Hyde Park, Boston 36, Mass.
 Sundstrand Engineering Co., 1327 Seventh St., Rockford, Ill.
 Sundstrand Pump Division, 2530 Eleventh St., Rockford, Ill.
 Sun-Fire Stoker Corporation, New Albany, Ind.
 Super Radiator Corp., 652 Stinson Blvd., Minneapolis 13.
 Superior Flux Co., 913 Public Square Bldg., Cleveland 13.
 Superior Sheet Steel Co., The, Division of Continental Steel Corp., Canton & Louisville Rd., Canton 1, O.
 Superior Steel Corp., Grant Bldg., Pittsburgh.
 Supreme Air Filter Co., 126 W. 21st St., New York City.
 Supreme Electric Products Corp., 194 Vassar St., Rochester 7, N. Y.
 Sure Comfort Furnace Co., 900 Des Plaines Ave., Forest Park, Ill.
 • Surface Combustion, 2375 Dorr St., Toledo 1, O.
 Sutphen & Co., J. W., 150 S. LaBrea Ave., Los Angeles.
 Swaby Mfg. Co., 2330 W. Cermak Rd., Chicago 8.
 Swaine Mfg. Co., Fred J., 1300 N. Seventh St., St. Louis.
 • Swartwout Co., 18615 Euclid Ave., Cleveland 12.
 Swift Mfg. Company, 247 McDougall Ave., Detroit.
 Synchro-Flame Burner Corp., 966 Main St., Brockton, Mass.
 • Synchromatic Corporation, 3373 North Holton St., Milwaukee 12.
 Synchro-Start Products, 221 E. Cullerton St., Chicago 16.
 Syntron Co., Homer City, Pa.
 Syracuse Fire Door Corp., 900 Canal St., Syracuse, N. Y.

T

- Taco Heaters, Inc., 342 Madison Ave., New York City.
 Tagliabue Mfg. Co., C. J., 550 Park Ave., Brooklyn 6.
 Tamms Silica Co., 228 N. LaSalle St., Chicago 1.
 Tannewitz Works, 315 Front Ave., N. W., Grand Rapids, Mich.
 Taylor Engineering Co., Metropole Hotel, Cincinnati.
 Taylor-Hall Welding Corp., 99 Hope Ave., Worcester 3, Mass.
 Taylor Instrument Companies, 95 Ames St., Rochester 1, N. Y.
 Taylor Sons Co., Charles, 715 Burns St., Cincinnati 14.
 Taylor-Winfield Corp., 1052 Mahoning Ave., N. W., Warren, O.
 Tecumseh Products Co., Tecumseh, Mich.
 Telist Insulation Co., 1933 West Farms Road, Bronx, N. Y.
 Tem Products Co., Midland, Pa.
 Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
 Tennessee Enamel Mfg. Co., 4104 Park Ave., Nashville 9, Tenn.
 Tennessee Products Corp., American Natl. Bk. Bldg., Nashville, Tenn.
 Thatcher Furnace Company, Centre St., Garwood, N. J.
 Thermal Industries, Indio, Calif.
 Therminsul Corp., 1603 Fulford St., Kalamazoo, Mich.
 Thermold Rubber Div. of Thermold Co., Whitehead Rd., Trenton 6, N. J.
 Thomas Machine Manufacturing Co., Etna Branch P. O., Pittsburgh 23.
 Thompson & Company, 1085 Allegheny Ave., Oakmont (Pittsburgh Dist.), Pa.
 Thomson-Gibb Electric Welding Co., 161 Pleasant St., Lynn, Mass.
 ThruBond Flashing Corp., 1204 Washington Ave., New York City.
 Thrush & Company, H. A., Peru, Ind.
 Tierney Rotor Ventilator Co., 239 4th Ave., S., Minneapolis.
 Tiffin Eaves Trough Clamp Co., 25 Miami St., Tiffin, Ohio.
 Timken Roller Bearing Co., 1835 Dueber Ave., S. W., Canton 6, Ohio.
 Timken Silent Automatic Div., Timken-Detroit Axle Co., 100 Clark Ave., Detroit 32.
 Timm & Son, P. C., 2626 C St., Lincoln, Nebr.
 Tint Manufacturing Co., Inc., P. O. Box 794, Denver, Colo.
 Tinnerman Products, Inc., 2065 Fulton Rd., Cleveland 13.
 Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, O.
 Toch Brothers, Inc., 2600 Richmond Ter., Elm Park, S. I., N. Y.
 Todd Shipyards Corporation (Combustion Eq. Div.), 601 W. 26th St., New York 1.
 Topflight Tool Co., Chestnut Ave., Towson, Md.
 Torchwell Equipment Div., National Cylinder Gas Co., 1035 W. Lake St., Chicago.
 Torit Manufacturing Co., 292 Walnut St., St. Paul 2.
 Tork Clock Co., Inc., 1 Grove St., Mt. Vernon, N. Y.
 Torrington Co., Field St., Torrington, Conn.
 Torrington Mfg. Co., 70 Franklin St., Torrington, Conn.
 Townsend Co., New Brighton, Pa.
 Trade-Wind Motor Fans, Inc., 5725 S. Main St., Los Angeles.
 Trane Co., The, La Crosse, Wis.
 Tremont Nail Company, Box 111, Wareham, Mass.
 • Trerice Co., H. O., 1420 W. Lafayette Blvd., Detroit 16.
 • Triangle Manufacturing Co., 383 Division St., Oshkosh, Wis.
 Trimount Rotary Power Co., 296 Whiting Ave., East Dedham, Mass.
 Trindl Products, Ltd., 2227 BD-Calumet Ave., Chicago.
 Triox Engineering Co., 207 Board of Education Bldg., St. Louis.
 Triplex Mfg. Co., Peru, Ind.
 Tri-State Heating Supply Co., 234-236 Murray St., Fort Wayne 5, Ind.

- Tropic-Air Stoker Co., 2017 Indiana Way, N. E., Canton 5, O.
 Tropical Paint & Oil Co., 1244-86 W. 70th St., Cleveland.
 Trumbull Electric Mfg. Co., Woodford Ave., Plainville, Conn.
 Truffo Fan Co., 623 Main St., Harmony, Pa.
 Truscon Laboratories, Caniff & Grand Trunk R. R., Detroit 11.
 Truscon Steel Co., Albert St., Youngstown 1, O.
 Tubular Rivet & Stud Co., Wollaston 70, Mass.
 Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54.
 Turner & Seymour Mfg. Co., Lawton St., Torrington, Conn.
 Turner Brass Works, 823 Park Ave., Sycamore, Ill.
 Tuthill Pump Company, 939 E. 95th St., Chicago 19.
 • Tuttle & Bailey, Inc., Corbin Ave., New Britain, Conn.
 Tweco Products Company, English at Ida, Wichita 7, Kan.
 Twentieth Century Heating & Ventilating Co., 96 Ira Ave., Akron, Ohio.

U

- Uehling Instrument Co., 473 Getty Ave., Paterson 3, N. J.
 Una Welding, Inc., 1615 Collamer Ave., Cleveland 10.
 Unified Air Conditioner Co., 322 W. Michigan St., Duluth, Minn.
 Uniflow Mfg. Co., East Lake Road, Erie, Pa.
 U-Ni-Matic Heating Systems, Inc., 1303 W. Slauson Ave., Los Angeles 44.
 • Union Manufacturing Co., Inc., 6th & Washington Sts., Boyertown, Pa.
 Union Steam Pump Co., S. W. Capital Avenue, Battle Creek, Mich.
 Unique Manufacturing Co., Inc., 218 W. Walton St., Chicago.
 United Chromium, Incorporated, 51 E. 42nd St., New York City 17.
 United Cork Companies, Central Ave. & N. J. Central R. R., Kearny, N. J.
 United Electric Controls Co., 69 "A" St., South Boston 27.
 United Metal Hose Co., Inc., 36-01 43rd Ave., Long Island City 1, N. Y.
 United Metal Prod. Div., Canton, Ohio.
 • U. S. Air Conditioning Corp., 2101 Kennedy St., N. E., Minneapolis.
 United States Brass & Copper Co., Hyde Park Ave., Hyde Park, Mass.
 United States Burner Corp., River Road, Wethersfield, Conn.
 U. S. Cistern Filter Mfg. Co., The, 509 S. McClun St., Bloomington, Ill.
 U. S. Electrical Motors, Inc., 200 E. Slauson Ave., Los Angeles 54.
 United States Electrical Tool Co., 1050 Findlay St., Cincinnati 14.
 U. S. Expansion Bolt Co., Inc., P. O. Box 827, York, Pa.
 U. S. Gutta Percha Paint Company, 14 Dudley St., Providence 1, R. I.
 United States Gauge Co., Sellersville, Pa.
 United States Gypsum Co., 300 W. Adams St., Chicago 6.
 • U. S. Machine Corporation, Lebanon, Ind.
 United States Mineral Wool Co., 9 S. Clinton St., Chicago.
 United States Ozone Co. of America, Crescent St., Scottsdale, Pa.
 United States Radiator Corp., 1500 United Artists Bldg., Detroit 31.
 • United States Register Co., Burnham St., Battle Creek, Mich.
 U. S. Rock Wool Co., 40 S. Main, Salt Lake City 1.
 United States Rubber Co., 1230 Sixth Ave., New York 20.
 United States Steel Corp., 436 Seventh Ave., Pittsburgh 30.
 United States Steel Supply Co., 1319 W. Wabasha, Chicago.
 U. S. Stoneware Company, Akron, Ohio and 60 E. 42nd St., New York City 17.
 Universal Air Filter Corp., 332 W. Michigan St., Duluth 2, Minn.
 Universal Blower Co., 1090 S. Adams Ave., Birmingham, Mich.
 Universal Cooler Corp., 299 Joseph St., Marion, Ohio.
 Universal-Cyclops Steel Corp., Bridgeville, Pa.
 Universal Gypsum & Lime Co., 111 W. Washington St., Chicago.
 Universal Manufacturers, Inc., Midland Park, N. J.
 • Universal Power Corporation, 4900 Euclid Ave., Cleveland 3.
 Universal Zonolite Insulation Co., 135 S. LaSalle St., Chicago 3.
 Uno Ventilator Co., 565 Lincoln Ave., Cliftondale Station, Saugus, Mass.
 Utica Products, Incorporated, Utica 4, N. Y.
 • Utility Appliance Corporation, 4851 S. Alameda St., Los Angeles 11.

V

- Vall Mfg. Co., 1017 Columbia Ave., Fort Wayne, Ind.
 Valley Mfg. Co., Fryeville, Athol, Mass.
 Van Dorn Electric Tool Co., Towson 4, Md.
 Van Noorden Co., E., 100 Magazine St., Boston 19.
 Vapor Car Heating Co., Inc., 50 E. Jackson Blvd., Chicago.
 Vendor Slate Co., Inc., P. O. Box 204, Nazareth, Pa.
 Ventilating Products Co., 2800 Cottage Grove Ave., Chicago.
 Vent-O-Lite Co., 4230 W. Taylor St., Chicago 24.
 Vermont Structural Slate Co., Inc., P. O. Box 98, Fair Haven, Vt.
 • Verson Allsteel Press Co., 1351 E. 93rd St., Chicago 19.
 Vibration Eliminator Co., 8-22 Astoria Blvd., Astoria 2, N. Y.

Vibration Control Company, 521 Fifth Ave., New York City.
 Victor Electric Products, Inc., 2950 Robertson Road, Cincinnati 9.
 Victor Equipment Co., 844 Folsom St., San Francisco 7.
 Victor Oil Burner Mfg. Co., 250 Pleasant St., Hartford, Conn.
 • Viking Air Conditioning Corp., 5600 Walworth Ave., Cleveland 2.
 • Viking Mfg. Corp., U. B. Bldg., 16th Floor, Dayton 2, Ohio.
 Viking Pump Co., 404 State St., Cedar Falls 1, Ia.
 Viking Shear Co., 1063 W. 19th St., Erie, Pa.
 Vilter Mfg. Co., 2217 S. First St., Milwaukee 7.
 Virginia Rubatex Div., Great American Industries, Inc., Bedford, Pa.
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 Voss Co., J. H. H., 785 E. 144th St., Cor. Wales Ave., New York City 54.
 Vulcan Electric Co., Div. Consolidated Electric Lamp Co., Inc., 88 Holten St., Danvers, Mass.
 Vulcan Metal Products Company, 1st Ave. at 39th St., N., Birmingham, Ala.

W

Wade Manufacturing Co., 77 N. State St., Elgin, Ill.
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 • Wagner Electric Corp., 6440 Plymouth Ave., St. Louis 14.
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 Waldron Corp., P. O. Box 110, John, New Brunswick, N. J.
 Wales-Strippit Corporation, 345 Paine Ave., North Tonawanda, N. Y.
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 Western Brass Mill Div., Olin Industries, Inc., East Alton, Ill.
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 Westwick & Son, Inc., John, Claude & Meeker Sts., Galena, Ill.
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 Wheeling Furnace Corporation, Martins Ferry, Ohio.
 Wheeling Steel Corp., Wheeling Steel Bldg., Wheeling, W. Va.
 • White Mfg. Co., 2362 University Ave., St. Paul, Minn.

• White-Rodgers Electric Co., 1209 Cass Ave., St. Louis 6.
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 Whiting Stoker Sales Co., 11 S. LaSalle St., Chicago 3.
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 • Whitney Mfg. Co., W. A., 636 Race St., Rockford, Ill.
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 Whitty Company, Inc., 86 Western Ave., Boston 34.
 Wickwire Spencer Steel Co., 500 Fifth Ave., New York City 18.
 Wiedemann Machine Co., 1815 Sedgley Ave., Philadelphia 32.
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 Williams-Wallace Co., 160 Hooper St., San Francisco 7.
 • Williamson Heater Co., 337 W. Fifth St., Cincinnati 2.
 Willis Steel Corporation, 156 N. Academy St., Galesburg, Ill.
 Willson Products, Inc., 248 Thorn St., Reading, Pa.
 Will-Weld Mfg. Co., Inc., 600 S. 15th St., Omaha 2, Nebr.
 Willy's Carbide Tool Company, 1340 W. Vernor Highway, Detroit.
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 • Wise Furnace Co., 101 Lincoln St., Akron 8, O.
 • Wiss & Sons Co., J., 11-45 Littleton Ave., Newark 7.
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 Wolfe-Kote Co., 705 Center Ave., Sheboygan, Wis.
 Wolff and Company, Benjamin, 58th St. at Seeley Ave., Chicago.
 Wolverine Tube Div. Calumet and Hecla Consolidated Copper Co., 1419 Central Ave., Detroit 9.
 Wood Conversion Co., First National Bank Bldg., St. Paul 1, Minn.
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 Wood Steel Co., Alan, P. O. Box 112, Conshohocken, Pa.
 Woodhill Chemical Co., 3708 E. 93rd St., Cleveland.
 Wood's Sons Co., T. B., 1275 Fifth Ave., Chambersburg, Pa.
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 Woolwine Metal Products Co., Atlantic Blvd. & S. Riverside Dr., Los Angeles.
 Worcester Brush & Scraper Co., Div. Mason Worcester Co., 38 Austin St., Worcester, Mass.
 Worcester Pressed Steel Co., 99 Barber Ave., Worcester 6, Mass.
 Worthington Pump & Machinery Corp., Harrison, N. J.
 Wyoming Stoker Worm Co., 58 E. Eighth St., Wyoming, Pa.
 Wyson and Miles, 625 Fulton St., Greensboro, N. C.

X

XL Refrigerating Co., Inc., 1834 W. 59th St., Chicago.
 X-Pando Corp., 43-15 36th St., Long Island City 1, N. Y.
 XXth Century Heating & Ventilating Co., 96 Ira Ave., Akron, O.

Y

Yardley Plastics Company, 142 Parsons Ave., Columbus 15, O.
 Yardley Venetian Blind Co., 138 Parsons Ave., Columbus 15, O.
 Yarnall-Waring Company, Chestnut Hill, Philadelphia 18.
 Yeomans Bros. Co., 1433 Dayton St., Chicago 22.
 • Yoder Co., 5500 Walworth Ave., Cleveland 2.
 York Corrugating Co., Adams St. & WM RR., York, Pa.
 York Corp., Roosevelt Ave., York, Pa.
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 York Electric and Machine Company, 1241 W. King St., York, Pa.
 Young & Bertke Co., 1004-1014 Hulbert Ave., Cincinnati 14.
 Young Radiator Co., 709 Marquette St., Racine, Wis.
 Young Regulator Co., 4500 Euclid Ave., Cleveland.
 Youngstown Sheet & Tube Co., Stambaugh Bldg., Youngstown, O.

Z

Zallas Brothers & Johnson, Taylor and Locust Sts., Wilmington 99, Dela.
 Zapon Div. Atlas Powder Co., North Chicago, Ill.
 Zeh & Hahnemann Co., 182-200 Vanderpool St., Newark 5.
 Zenith Electric Company, 152 W. Walton St., Chicago 10.
 • Zink Co., John, 4401 S. Peoria St., Tulsa, Okla.

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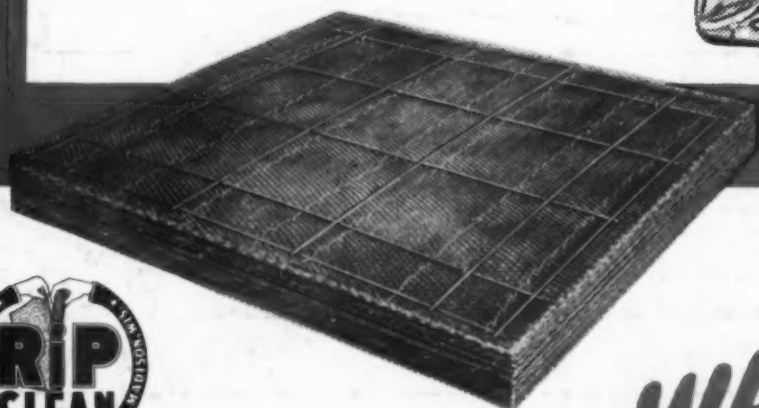
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